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LOCAL BOARD OF HEALTH, HINDMARSH: REPORT ON DIPHTHERIA IMMUNIZATION CAMPAIGN.

By J. M. DWYER, M.B., B.S. (Adelaide),

Officer of Health, Hindmarsh; Honorary Demonstrator in Pathology, University of Adelaide; Second Medical Officer, Venereal Diseases Clinic, Adelaide Hospital.

THE Council of the Corporation of Hindmarsh had been cognizant of the value of diphtheria immunization at least twelve months before the scheme, just completed, began to be organized; for in October, 1934, I was called upon to report on the probable cost of such a scheme. The computed cost was at that time held to be too high.

In October, 1935, Mr. Mudie, the Town Clerk, informed me that the South Australian Government had made available £200 on the estimates at the instigation of the Chairman of the Central Board of Health, but as yet no definite scheme had been worked out regarding its distribution. We thought at the time, probably urged to some extent by previous knowledge of government capriciousness, that if we "hopped in" we might get an allocation of money sufficient for our scheme. We were met with help in abundance from every side. The Corporation of Hindmarsh, conscious of the protection it could give the residents of its district, was willing to meet extra expenses necessary and took the lead, fully realizing that it was setting an example to the rest of the metropolitan area and helping the Central Board in the campaign it was about to initiate.

A meeting of the medical practitioners of the district was called and they decided unanimously that they were in accord with the objects of the corporation of the town and would cooperate in the

immunization of children between twelve months and twelve years of age, a fee of 2s. 6d. per person immunized to be charged, according to a regulation then imposed by the British Medical Association (this was altered since to 7s. 6d., but did not affect the Hindmarsh scheme). The method of immunization by means of the anatoxin of Ramon was favoured, with the use of three injections, preceded by the intradermal sensitization test of Moloney. It was decided not to apply the Schick test. Owing to the short space of time left for the year it was decided to inform the council that no immunization could be done before 1936, as school holidays would interfere; but in the meantime preliminary organization could be carried out. Consequently when the meeting of the Metropolitan Local Boards of Health was called to discuss diphtheria immunization, Hindmarsh had already formulated a plan of campaign and offered to forward a copy of the scheme to any council that wished to carry out the same work. At the time of this meeting I reported that replies to 1,044 circulars had been received, showing that 61·2% of those approached had accepted the offer made. A copy of the circular and consent forms is included in the appendix of this report (*vide* Appendices 4 and 5). These circulars were distributed to children attending the schools in the district, parents being asked to fill in the consent forms and return them to the school. In February, 1936, the Central Board of Health, on the request of Mr. G. D. Mudie (Town Clerk), kindly forwarded a list of all births in the town of Hindmarsh during the last six years, as notified by the *Births Earlier Notification Act* of 1926. This was a very great help in sending circulars to parents of children under school age, when older children were not already attending school; but the list was found to be incomplete because of migration into the district since, which mattered; and inaccurate because of migration out of it, which did not; and also because of the activities of unregistered midwives, who naturally would not notify those births in which they were concerned.

The nursing assistance was obtained through the Deputy Director of Medical Services, who, through Colonel H. H. E. Russell, made available the members of the Voluntary Aid Detachment of the Fourth Military District. Too much cannot be said for the eagerness and enthusiasm of those "V.A.D.'s" who assisted day by day for three months. The standard of their work, after the first week or so, rapidly approached that of trained nurses, and at the finish of the campaign could not have been bettered. There were no squabbles or disruption, and the work done by them was entirely honorary. Whenever possible, six were on duty daily.

In February the following detailed instructions were multigraphed and distributed to all connected with the campaign; at the same time the first roster of medical practitioners was drawn up and distributed. The instructions are reproduced *verbatim*.

Local Board of Health for the Town of Hindmarsh.

Diphtheria Immunization.

DETAILS OF CAMPAIGN.

Immunization to commence 3/3/36 at 3.30 p.m. at Hindmarsh.

By this date the following details will have been attended to.

A. 1. All immunization cards entered for individuals (*vide* Appendix 6).

2. All cards grouped into school grades in respective schools.

3. Details of numbers in each grade ascertained.

4. Grouping of grades or schools into batches of sixty approximately according to circumstances. The centres are Hindmarsh, Croydon and Brompton. Hindmarsh includes Bowden Kindergarten, Welland and St. Joseph's. Brompton includes Good Shepherd and Christian Brothers.

5. Cards of each centre are differently coloured.

B. 1. Persons responsible in each school will be informed of A. 4 and asked to arrange children accordingly. Hand to each child its immunization card according to C. 1.

2. Suitable two-doored rooms with electric power chosen in schools, and any limitation of time available ascertained.

3. A roster of groups, with names arranged alphabetically in each group to be done, will be forwarded to the schools, outlining the programme a full week in advance.

4. (I) B. 3 will be made out allowing for the three weeks' intervals between injections so that future injections will not be interfered with by school or public holidays, or clash with fresh batches when the first are receiving later injections.

(II) Obviously Moloney testing cannot be done on the last day of the week nor injections of anatoxin on the first day of the week in the first batch of volunteers. Injections of anatoxin will be done on all available days in the second and third rounds. In first batches groups will be attended on consecutive days.

5. On receiving each day's injections each child will receive a slip of paper notifying when and where required for the next injection. This is not so important for the school children as for those of pre-school age, over whom no organized control is possible.

6. Children who have been Moloney tested must report the following day. Those who give a reaction will be placed in a separate group to receive anatoxin later.

7. The names of all children born in the district during the last six years have been obtained from the Central Board of Health by means of the *Early Notification of Births Act*, 1927. The families still living in the district who have not already received forms or whose eldest child is not yet attending school will be circularized and asked on application to bring the child up for immunization at a certain time and place.

8. Placards or signs to advertise the campaign to be erected.

CLERICAL STAFF AND RECORDS.

C. 1. The clerical staff will have all clerical arrangements ready to commence at 3.15 each day in order that groups may be checked and distributed.

2. The clerk will call out the name of each child as it comes up for treatment and will see the correct entries are made on the correct cards.

3. The clerk will see or make suitable arrangements so that B. 5 is carried out.

4. (I) A clerk will be responsible for duplicating the cards after each day's work or at a suitable time so as to see that when the first batch of children have received their half cubic centimetre of anatoxin the complete set is ready to be forwarded to the Central Board of Health.

(II) If the Central Board of Health desires to have full particulars these cards must be produced at least a week prior to the first one cubic centimetre dose being given, in order to be grouped in the same way as our originals.

5. On completion of the complete course at the end of the six weeks each card will be filed away alphabetically and form a permanent record to be kept by the Local Board of Health.

6. On the completion of the campaign every infectious disease notified will be entered on the back of the appropriate card, if found on search of the cards to be in a person previously immunized.

7. Cards have been supplied to private practitioners in the district, and on completion will be filed with the others, but in the space marked "School" will be marked "Private".

MEDICAL STAFF.

D. 1. Medical practitioners of the district will work in pairs according to a roster to be drawn up. Each pair will be in attendance not later than 3.30 p.m. Whenever possible, as the scheme progresses, starting time may be earlier in order to facilitate working of the school staffs.

2. There will be a sterilizer attendant or nurse who will attend to the sterilizing according to typed instructions (see below) of needles and syringes and the filling of syringes with anatoxin. Two persons may be necessary for this work when Moloney testing is finished.

3. An attendant will be responsible for preparing the site of injections by swabbing the upper arm on the fleshy part just below the shoulder joint. Forearm for Moloney test.

4. Typed instructions will be those recommended by the Commonwealth Serum Laboratories Catalogue, 1934-35, page 103.

STERILIZATION OF INSTRUMENTS.

Place two syringes and six dozen needles in each of the two trays in the bath and boil them continuously in clean water for at least ten minutes. Then with sterile forceps lift one tray from the bath and drain as much water as possible from the instruments which it contains. Manipulate these instruments with sterile forceps, touching with the hands only the dry exterior of the barrel of the syringe and the correct end of the plunger. Use only sterile forceps to fix the needle to the syringe and make fast. During this operation do not touch any part of the needle with the fingers. "As each needle is used, place it aside. When all twelve have been contaminated, replace them with the syringe in their tray. From the bath lift the second tray and drain it. Then, and not until then, replace the first tray in the bath and boil it for ten minutes again. Thus no instrument will be withdrawn from the bath unless it and everything else therein has had at least ten minutes of boiling. Remember that the addition of any contaminated article to the bath makes a further ten minutes' boiling necessary. Sterilize the forceps by boiling or by thorough heating in a gas or spirit flame. Clean and dry the hands thoroughly, do not place them in the boiled water nor upon a wet syringe. Avoid having wet hands when using a dry syringe, lest organisms be carried to the needle-shaft. A dust-laden atmosphere is highly undesirable. Draughts from windows or fans should be avoided."

5. Medical practitioners, for the sake of uniformity and to facilitate administration, are recommended to follow the instructions for the administration of anatoxin in the same booklet, pages 106-108.

6. *The Moloney Test.*—"Anatoxin diluted 1 in 20 for the purpose is supplied with the product. Sterilize the forearm and inject 0·1 (one-tenth) c.c. of this dilution intradermally. If the needle be introduced bevel uppermost until its oval opening be but faintly visible through the superficial layers of the epidermis, the injection will be truly intradermal".

7. *Reading the Test.*—"An area of redness of more than 12 millimetres (one-half inch) in diameter must be considered a reaction. No person giving such reaction should be immunized by full doses of anatoxin. The redness may be attended by a greater or less degree of infiltration. It reaches its maximum within twenty-four hours and may be read either then or within the twenty-four hours. Immunization, if decided upon, should be commenced as soon as possible after testing".

8. *Technique of Immunization by Anatoxin.*—"For all ages from twelve months upwards two subcutaneous doses are advised, the first 0·5 (one-half) c.c., the second, three weeks later, of 1·0 c.c. Ninety per cent of persons subjected to this procedure will thereby be immunized. If a third dose be given, immunity for practically all the recipients will be assured. This third dose, the administration of which is urged, should be of 1 c.c. and given three weeks after the second. *Anatoxin should never be injected intramuscularly or intravenously*".

APPENDIX 1.

Volunteers as at 20th February, 1936.

	Yes.		No.	Yes.
Hindmarsh	265	..	215	
Welland	51	..	17	
St. Joseph's	50	..	33	386
Bowden Kindergarten	21	..	1	
Brompton	240	..	140	
Good Shepherd	32	..	25	
Christian Brothers .	16	..	—	274
Croydon	182	..	128	
	857	..	523	

APPENDIX 2.

Materials Required.

14 1 c.c. syringes tuberculin.
12 dz. 18 gauge "Acidex" needles, ½".
Cotton wool, 2 lbs.
4 plain dissecting forceps.
Methylated spirits.
3 buckets.
6 basins or kidney dishes or pie dishes, 2 hand basins.
½ dz. towels.
Soap.
Rubbish receptacle.
Flex for connexion with sterilizer.
4 tables, clerical, instrumental, sterilizing.
3 chairs.

APPENDIX 3.

Incidences of Diphtheria to October 31, 1935.

Under 6 years	18	..	18
6–10 years	35	..	35
0–10 years	53	..	
10–13 years	5	..	5
Over 14 years	6	..	6
	—		—
		..	64
	—		—

(*Vide* page .)

APPENDIX 4.

Diphtheria is a dangerous disease to which children are very susceptible. It is always present to some extent in every community, and occasionally becomes a widespread epidemic.

The disease is now prevalent in our midst. Your Local Board of Health offers to you the means of protecting your children. The method consists of injections under the skin of a specially prepared fluid. A preliminary injection is made to test the child's

susceptibility to the fluid; a series of three small injections are then given, with an interval of three weeks between each.

The procedure is safe and simple, and provides very effective protection for the child against diphtheria. Unless the full course of three injections is given, however, this very effective protection cannot be guaranteed.

The injections will be given to all children up to the age of twelve years whose parents wish to avail themselves of the opportunity.

A young child treated in this way is protected during all his school-going years. It is therefore better to treat the young children—indeed, in many places children of the age of one year are treated—because they are given the protection during the early years when the greater risk of contracting diphtheria is present.

APPENDIX 5.

Please complete this form and give it to your child to return to the school teacher.

To Hindmarsh Local Board of Health School Centre.

I agree to have my children immunized against diphtheria.

Full Names of Children. (Please give names of all children whether you wish them immunized or not.)	Age.	Class.	School.
1.			
2.			
3.			
4.			
5.			

.....Parent or Guardian.

I do not agree to have my children immunized against diphtheria.

.....Parent or Guardian.

Address.....

.....

Date.....

APPENDIX 6.

....

Surname. Christian Names.

Address..... Age.....

School..... Class.....

MOLONEY TEST. Result. Date.	SCHICK TEST. Result. Date.

ADMINISTRATION OF ANATOXIN.

	Date.	Remarks.
0·5 c.c.	.....	.....
1·0 c.c.	.....	.....
1·0 c.c.	.....	.....

Hindmarsh Local Board of Health
Diphtheria Immunization.

It was found that the scheme worked very well, and only two or three minor modifications were necessary; these have been incorporated. The machinery for following-up next year can be put into operation at a moment's notice. So, in all matters of organization, the value of giving all persons connected with the scheme the full details of the campaign for perusal before commencing work was inestimable.

With experience and as team work developed, the number of children put through daily was gradually increased, and on one occasion 312 children received injections in an hour. With adequate staffing, one medical practitioner could do 120 an hour. Under the present system, the pace of which is largely determined by the Commonwealth Serum Laboratories' wise refusal to put up anatoxin in multiple doses in the same container, greater speed is undesirable.

With large numbers of children it is found advisable to have at least half as many needles as children and to have about six syringes for each medical practitioner; this overcomes delays in sterilizing. The tuberculin syringes recommended by the Commonwealth Serum Laboratories are not entirely satisfactory, nor have we found a type that is, although it is thought that syringes with metal plungers of the "Record" pattern would be suitable, provided 0·1 cubic centimetre measurements could be made.

The kindness of F. H. Faulding Limited in lending a sterilizer, subsequently purchased, and of Kelvinators Limited in lending a refrigerator, helped considerably in the campaign.

The cost of the campaign was as follows:

	£	s.	d.
Medical fees	139	2	6
"V.A.D.'s" fares	7	17	8
Equipment	24	13	8
Material for Schick test, methylated spirits *et cetera*	1	16	11
Laundering		10	0
Cards, circulars, forms *et cetera*	5	17	6
Total	£179	18	3

This does not include power and furniture supplied by the Education Department at the schools. The cooperation of the Education Department contributed to the success of the campaign.

The practitioners of Hindmarsh who carried out the Moloney testing, Schick testing and inoculation with anatoxin were Dr. J. A. Bonnin, Dr. A. D. Byrne, Dr. C. F. Drew, Dr. J. M. Dwyer, Dr. C. F. Pitcher, Dr. J. G. Sweeney and Dr. R. D. Wallman.

Mr. C. H. M. Webb, Health Inspector, was responsible for, and very ably attended to, the daily preparations and very much other work.

Results.

In discussion of the results, a comparison is made with a larger series in a manufacturing city in England, frequent reference being made to a paper by E. A. Underwood on his work at Leeds. Though Hindmarsh may be classed as a manufacturing town, it is not implied that similar and comparable conditions exist in each place. So far as I am aware, no attempt has been made to compare Australian figures in a diphtheria immunization campaign with overseas figures, and therefore the attempt is made in a small way here.

Table I shows the number of children treated in the respective age groups, with their reaction to the Moloney test.

TABLE I.

Age in Years.	Number Treated.	Reaction to the Moloney Test.	No Reaction to the Moloney Test.
Under one	15	Nil	15
Under one	34	1	34
Under two	63	1	62
Under three	55	2	53
Under four	69	Nil	69
Under five	95	6	89
Under six	115	9	106
Under seven	129	5	124
Under eight	126	14	112
Under nine	130	11	119
Under ten	103	21	82
Under eleven	105	16	89
Under twelve	73	14	59
Total	1,113	100	1,013

The 1,113 children represent at least 50% of the available children in the town of Hindmarsh. The total number of applicants was 1,238; of these, 125 did not attend for treatment. Of the 1,113 treated, 100, or 8·98%, gave a positive reaction to the Moloney test. Three had delayed Moloney reactions, as described by Underwood,[1] which were detected accidentally, as is usually the case. How many other reactions occurred is a matter of conjecture, but Underwood states that the reaction has a frequency of 1·69% ± 0·17%.[1] This is a moderate Moloney reaction occurring from the fourth to the seventh day, frequently about the sixth day, and fading in forty-eight hours.

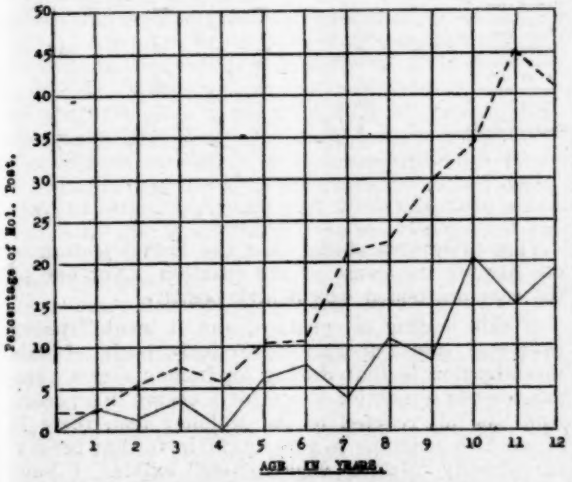

FIGURE I.

One of our patients showed a reaction to the anatoxin and will be described later.

A graph (Figure I) shows the percentage of positive Moloney reactions at varying ages up to twelve years. A maximum percentage of 20·4 is recorded at ten years; and, although it is 1·2% less at twelve years, the variation is probably not outside normal limits. Several medical students, all over eighteen years of age, and members of the Voluntary Aid Detachment, were tested, and the percentage of positive reactions to the Moloney test approached 50.

Comparing this with the graph given by Underwood[1] and the figure by Mitman,[2] both concerned with a very much greater number of cases (30,766), our incidence in children would appear to fall somewhat below that of other countries. The few adults considered would indicate a normal urban incidence.

It was decided to ascertain how many of those 100 children who gave positive Moloney reactions were susceptible to diphtheria. A request for Schick testing material made to the Central Board of Health was refused. The Hindmarsh Local Board then supplied the material. Fifteen of the 100 children failed to attend, but the results are shown in Table II.

TABLE II.

Age in Years.	Moloney Test +. Schick Test −.	Moloney Test +. Schick Test +.	Moloney Test +. No Schick Test Made.
Under one	Nil	Nil	Nil
Under one	Nil	1	Nil
Under two	Nil	1	Nil
Under three	1	Nil	1
Under four	Nil	Nil	Nil
Under five	2	2	2
Under six	6	2	1
Under seven	2	2	1
Under eight	10	1	3
Under nine	6	2	3
Under ten	14	6	1
Under eleven	7	7	2
Under twelve	7	6	1
Totals	55	30	15

+ = reaction; − = no reaction.

Thus 30 out of 85 (35%) of those who gave positive Moloney reactions also reacted positively to the Schick test. This is a somewhat higher percentage than Underwood's[1] maximum (32·4), and indicates that while the incidence of relative immunity is higher in the Moloney reactors, the Moloney reaction cannot replace the Schick test. From our limited experience, it is doubtful whether the pseudo-Schick reaction can take the place of the Moloney test, as suggested by Mitman,[2] but denied by Underwood.[1] All children who reacted to the Moloney and the Schick tests were immunized with three doses of 0·01 cubic centimetre of anatoxin at intervals of three weeks, as recommended by the Commonwealth Serum Laboratories.

Reactions Following Administration of Anatoxin.

In 43 patients reactions of varying severity occurred after the administration of anatoxin. Four patients had temperatures ranging between 37·8° C. and 39·45° C. (100° F. and 103° F.), and it is probable the majority had some pyrexia. Delirium

with a temperature of 39·45° C. (103° F.) occurred in one patient twenty-four hours after the administration of 0·5 cubic centimetre of anatoxin. This patient accidentally received a second dose of 1·0 cubic centimetre of anatoxin and experienced a similar reaction nearly as severe.

The reaction may commence from within a few hours (in one case it commenced after a few minutes) to five days after the administration of anatoxin. It may reach its maximum within twelve hours of its appearance or gradually develop and expand for two or three days, while the induration may be gone in twenty-four hours or last for a week or ten days. Generally the later the reaction appears, the slower it is in reaching the maximum.

One patient, J.P., was submitted to the Moloney test on March 31, 1936, and received 0·5 cubic centimetre of anatoxin on April 1, 1936. On April 6, 1936, she reported with a red, raised, tender, hot area at the site of the injection; it had begun to appear the day previously. Movement of the arm was painful and there was axillary adenitis. On this day the response to the Moloney test, originally negative, became positive (the delayed Moloney reaction mentioned above). This child continued to attend school.

In the other two cases of detected delayed Moloney reaction, there was no disturbance at the site of injection of the 0·5 cubic centimetre of anatoxin, nor did subsequent doses in these two patients produce a reaction. J.P. was found to be Schick negative.

The typical appearance of the reaction to anatoxin was that of a hot, red, raised, indurated area which in the early stages spread by "pseudopodia" until the maximum extent was attained. If the skin of the arm was imagined as flattened out instead of being moulded to the roundness of the arm, then in most cases the area affected was circular in outline. The diameter of the circle was usually between three and four inches. In a few cases the induration and redness almost encircled the arm. The larger the areas of reaction, the greater was the tendency for the larger diameter to be in the long axis of the limb. The heat of the reaction was peculiarly pungent and dry to feel. The induration could be picked up in the skin of the affected part and the edges of the area were regular in outline and stood out from the surrounding skin so as to be clearly visible and palpable.

Whenever these reactors complained of pain sufficient to lessen the use of the arm, there was an axillary adenitis. In some instances anorexia occurred. In one case no meals were taken for two days after the injection of 1·0 cubic centimetre of anatoxin. There are records of at least three children who missed school as a result of the reaction; there may have been twice this number who were not reported as having done so.

Three patients complained of "shivers" when the reaction was at its height. One seen at this time had a temperature of 38·84° C. (101·9° F.).

One reaction was especially severe.

A medical student had 0·5 cubic centimetre of anatoxin without being submitted to the Moloney test. He was unable to work for a week, felt very ill and had pains in his limbs, back and joints as his reaction developed, twenty-four hours afterwards, with a severe throbbing headache which, he states, was worse than any he had known. The area of reaction affected nearly all his upper arm and extended to his forearm. There was enlargement and tenderness of axillary and inguinal lymph glands on both sides. Anorexia, lasting some days, and sweats occurred.

Those of the forty-three reactors to prophylactic doses of anatoxin who reported, when seen three weeks after the causative injection, were desquamating. Desquamation usually began about the end of the second week and was nearing completion when the patients were seen. Itchiness was complained of. A number of these reactors had previously had diphtheria; one had had the disease twice. Other similar cases were reported of multiple attacks. A child in the district is known to have had the disease three times. Reiche[3] reported that 5·8% of 4,761 patients in Hamburg were known to have a second attack.

It will be remembered that these reactors were "Moloney negative", since, according to the scheme, they would not have received anatoxin otherwise. We decided to submit them to the Schick test. The results are shown in Table III.

TABLE III.

Age in Years.	Reaction after 0·5 Cubic Centimetre of Anatoxin and Schick Test.	Reaction after 1·0 Cubic Centimetre of Anatoxin and Schick Test.	Reaction after 0·5 Cubic Centimetre of Anatoxin and No Schick Test.	Reaction after 1·0 Cubic Centimetre of Anatoxin and No Schick Test.
Under one ..	—	—	—	—
Under two ..	—	—	—	—
Under three ..	—	—	—	1
Under four ..	—	—	—	1
Under five ..	Nil	—	—	1
Under six ..	3	—	3	Nil
Under seven ..	3	2	3	2
Under eight ..	2	2	2	1
Under nine ..	Nil	3	Nil	5
Under ten.. ..	Nil	3	—	3
Under eleven ..	2	2	2	3
Under twelve ..	2	2	2	—
Total	12	14	12	17

This table also shows that the first injection is not always the cause of the reaction. Not one of the reactors tested was Schick positive.

If this finding is constant, and it would appear to be so, the important practical result of this investigation is that during an immunization campaign when a reaction to anatoxin occurs in a person who has not reacted to the Moloney test, there is no need to continue to give anatoxin to that person, for already "Schick negativeness" exists. I have not been able to find a report of a similar finding elsewhere. Next year an effort will be made to confirm it. It will be noted from Table III that the reaction occurs more commonly after the second injection. The fact that these reactors to anatoxin, though they did not react to the Moloney test, did not react to the Schick test in 100% of cases is not surprising since it has been known[2] that "the Moloney positive reaction usually but not invariably

develops *pari passu* with immunity", and these patients may have been about to develop an immunity naturally or as a result of their first injection. The preponderance of the severe reaction in the older age groups and its occurrence in children who have suffered from diphtheria would on the other hand suggest that these children were already "Schick negative" and were not previously discovered to be so when Schick testing was done as a routine preliminary to prophylaxis. There is evidence[4] that the causative agent in the Moloney reaction is a polysaccharide. The Schick positive reactors were given three doses of 0·01 cubic centimetre of anatoxin at three weeks' intervals.

At the outset of the campaign there was much discussion on the advisability of using alum precipitated toxoid (A.P.T.), following articles by Haine[5] and Naughten and others.[6] Rosenau[7] says: "It has certain advantages and is gradually displacing toxoid" (toxoid = anatoxin). The alum precipitated toxoid is used in the "one-shot method" of immunization. Barr and Glenny[8] have demonstrated that the increased antigenic property of aluminium toxoid over toxoid is due to its slow absorption and elimination. A rapid immunity has been established by means of it (Saunders).[9]

In view of the above and many other eulogistic references to alum precipitated toxoid, common in recent publications, it is interesting to find Bousfield[10] writing: "When dealing with children of all ages there is no safe short-cut to the three injection method if it is desired to produce adequate immunity." This is supported by J. G. Fitzgerald,[11] who reports the results of antitoxin titration in groups of alum precipitated toxoid (1·0 cubic centimetre, single injection) and anatoxin (three injections). After ten weeks 30% of persons given alum precipitated toxoid had one-fiftieth of a unit of diphtheria antitoxin per cubic centimetre of serum; the anatoxin gave a percentage of 91 with a like titration. After one year the three-dose group still gave 69%, with 91% over one one-hundredth of a unit, as against the alum precipitated toxoid 11% with one-fiftieth or more and 19% with one one-hundredth or more. "The superior results are in harmony with the recognized value of divided doses of antigen given at suitable intervals. It is clear that a single dose of any prophylactic cannot be as efficient."

"In Toronto, with a population of 630,000, 121,000 children have been immunized, including 17,000 by the one-shot method. Swabbing revealed not one carrier in 5,000 children." This is interesting in view of recent statements that the carrier rates, particularly of gravis forms of *Corynebacterium diphtheriæ*, tend to rise in immunized populations.[12] In non-immunized children, a carrier rate of 8% is certainly not unknown and has been demonstrated amongst school children at the Hindmarsh Public School during 1935. This alleged increase of carriers is stated to have been a reason why certain local boards of health in the metropolitan area decided not to carry out immunization.

So far (August 31, 1936), one case of diphtheria has occurred amongst children who have been inoculated with three injections of anatoxin; although four cases have occurred in the schools and in other patients over thirteen years of age and under six, these have constituted the bulk of cases in the last three months since the campaign ceased. "Schick negativeness" has been shown to be reduced 34% at the end of five years, but even then it is probable that one-third of the children who thus become apparently susceptible have the power to build up rapidly an active and fairly efficient response to infection.[13] Procházka[12] found diphtheria in 11% of 360 children admitted to the Na Karlove Fever Hospital, Prague; one of these died (2½%, that is, one out of 40), whereas 13 of the remainder died (4·1%). Twenty-seven of the forty had three injections of anatoxin.

The total number of cases of diphtheria which occurred in the Hindmarsh district from January 2, 1936, to August 31, 1936, was thirty-three.

The following eleven cases occurred between May 31, 1936, and August 31, 1936:

R.W.C., three years four months: Did not receive any treatment.
C.C., six years: Received Moloney test and two injections; did not report for last injection.
P.S., four years six months: Did not receive any injections.
M.P., twenty years: Over age.
D.S., four years: Received the full treatment; last injection given on May 7, 1936.
M.T., seven years: Did not receive the treatment.
J.W., eight years: Did not receive the treatment.
F.W., twenty-eight years: Over age.
F.I., twelve years: Did not receive the treatment.
L.W., eighteen years: Over age.
M.C., fifteen years: Over age.

From May 31, 1936, to August 31, 1936:

Under six years	3 cases
Six to twelve years	4 „
Over twelve years	4 „
Total	11 cases

The campaign was completed on June 13, 1936.

Summary.

1. Events leading up to the campaign are described.

2. A plan of campaign with details of organization is given. The value of dissemination of information before work is begun is stressed. The plan is capable of being used anywhere with modification to local conditions.

3. Some results of experience with the above prearranged plan are discussed. Costs are given.

4. A table of the results of Moloney testing is given and compared with the results obtained at Leeds in England, in an attempt to ascertain the relative incidence of Moloney reactions in an Australian urban population. A considerable disagreement is observed in the results. Delayed Moloney reactions are mentioned.

5. In a similar comparison the incidence of positive reactions to the Schick test among those who react to the Moloney test is higher in the Hindmarsh series.

6. Reactions following the administration of anatoxin to children who failed to react to the Moloney test are described and mention is made of lymphadenitis and desquamation.

7. When these reactors were treated by the Schick test, all failed to yield a reaction. If further investigation were to confirm this finding a useful practical application would arise from it.

8. The value of the anatoxin of Ramon compared with alum precipitated toxoid is discussed.

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ABDOMINAL PAIN IN CHILDHOOD.[1]

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IN approaching the problem of abdominal disease in childhood one is struck by certain factors which differentiate lesions occurring during the dynamic period of growth from those occurring during the static period of adult life.

First, acute surgical emergencies develop more rapidly and progress towards a fatal termination more quickly in children than in adults. Correspondingly they show a more rapid and satisfactory recovery after successful treatment. Early diagnosis and early operation are of paramount importance on this account.

Secondly, the patient we have to deal with is quite often too ill, too frightened or too young to give anything approaching an accurate account of symptoms; therefore one has to rely almost entirely on physical signs and on a history which should be carefully elicited from all available sources. When an attempt is made to get a history from a child, questions should be as simple and direct as possible; it is well to remember that pain is the paramount symptom to the young mind, and "Where does it hurt?" is often the only question that brings forth any useful information. Great tact is often required in gaining a child's confidence sufficiently to allow one to carry out an adequate physical examination. In cold weather abdominal palpation should be done very gently with the hand carefully warmed. Great help may be obtained by light anæsthesia in certain cases, especially when searching for a tumour; and bimanual examination, with one finger in the rectum and the other hand on the abdominal wall, allows exploration of the whole pelvis and of the lower part of the abdominal cavity.

Thirdly, the fact that certain abdominal conditions tend to occur within definite age periods may point a finger towards correct diagnosis, and on occasion a decision may be reached by knowing that at the age in question one condition is quite common while the other is extremely rare.

Fourthly, the pulse and temperature of the growth period are notoriously sensitive and may be temporarily upset by some quite trivial cause; and on that account a sudden rise in any one temperature or pulse reading may have no special significance. If, however, a two-hourly chart is kept and a sustained rise in pulse or temperature is noticed, a valuable sign has been recorded which may be the deciding factor in the diagnosis. Remember that the normal pulse rate, although varying within certain definite physiological limits, decreases in rate steadily from birth to the twelfth year (see Table I). Similarly, the normal respiration rate drops from about 35 per minute at two months to the neighbourhood of 23 per minute at twelve years.

TABLE I.
Pulse Rate in Childhood.

Age Period.	Rate per Minute.
Birth to second month	160 to 130
Second to sixth month	130 to 120
Sixth to twelfth month	120 to 110
First year to third year	110 to 100
Third year to fifth year	100 to 90
Fifth year to tenth year	90 to 80
Tenth year to twelfth year	80 to 70

Fifthly, in view of the fact that the history and progress of the case are given to the surgeon second hand as it were, no case of infantile abdominal pain should be treated lightly.

The temperament of the parent and his or her mental reaction to the child's illness should be assessed at their true value. What is a "violent, agonizing pain" to the anxious mother of the first-born child may be nothing more than "a bit of a stomach ache" to the unimaginative and unsympathetic father of ten.

[1] Read at a meeting of the Downs and South-Western Medical Association, Queensland, on July 19, 1936.

In considering the causes of abdominal pain in childhood, it seems feasible to discuss in some detail the commoner and more important conditions in relation to their age periods.

Colic.

You are, of course, all familiar with the colic of early infancy, which causes such distress to the anxious parents and sometimes incidentally to the doctor.

Flatulence is the commonest cause of infantile colic; it is due either to the excessive gulping of air, generally during feeding, or to fermentation of the intestinal contents with the formation of gas; constipation is a less common cause of colic in young infants. The behaviour of a child during an attack of colic is characteristic; he flexes his knee and hip joints, clenches his fists and cries lustily until the attack passes off.

Anal fissure is a condition which may occur in quite young children, generally as a result of careless use of enema syringes or from scybalous distension of the rectum; spasm of the *sphincter ani* results and the pain manifests itself in quite a different fashion from that of alimentary colic. The infant screams, throws back his head, and stretches out his lower limbs, with the thighs pressed tightly together.

Colic in young babies is often associated with some degree of vomiting; indeed vomiting, or, more correctly, posseting, frequently occurs in the absence of colic and in babies who are gaining weight and who are otherwise healthy; it may be taken as a physiological act.

Pyloric Stenosis.

Pyloric stenosis, on the other hand, presents a very different clinical picture.

Although cases were recorded as far back as 1777, this extraordinary condition appears to be manifesting itself with increasing frequency. From 1917 to 1933, 729 cases were treated at Great Ormond Street; approximately 80% of cases of pyloric stenosis occur in boys, and at least 50% in first-born children.

In the classical case one is given a history that the baby has been quite healthy for about the first four weeks of life, has gained weight and has been comparatively free from any digestive disturbance. Then he has suddenly commenced to vomit, lose weight and become constipated. The vomiting is forcible and projectile, and often the amount expelled is considerably greater than the quantity given at a single feed. Irritability and crying, a wide-awake, anxious look, visible peristalsis and a palpable tumour complete the clinical picture (Figure I).

These children do not actually suffer severe abdominal pain and often their crying is due to hunger, but I think that the forcible gastric peristalsis does produce a certain amount of subacute pain.

The discovery of a palpable tumour which is more easily felt under anæsthesia is pathognomonic, but frequently no lump can be felt and operation should not be delayed on this account. I am convinced that while the operation should not be treated as a surgical emergency, surgery is clearly indicated once the diagnosis is established.

The Rammstedt operation is the method of choice; local anæsthesia may be employed, and is, I think, advisable in the treatment of the more emaciated patients.

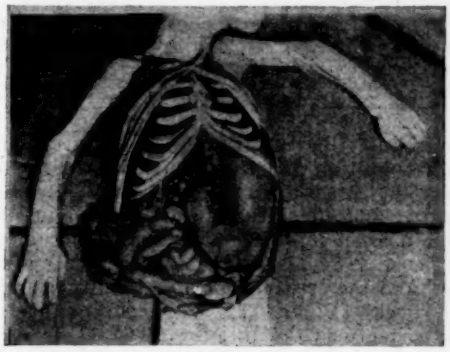


FIGURE I.
Congenital hypertrophic stenosis in a baby aged three and a half months, showing the dilated stomach and hypertrophied pylorus.

Pre-operative treatment consists in washing out the stomach and in the subcutaneous administration of saline solution. The umbilicus should be sealed off with cotton wool soaked in flexile collodion, as I have seen death follow infection from this area.

At operation hæmorrhage hardly ever causes any alarm, but great difficulty may be experienced in completely separating the hypertrophied muscle fibres at the duodenal end of the pylorus without perforating the mucosa.

One drachm of 5% glucose should be given one hour after operation and repeated in increasing amounts every hour for four hours. Then small feeds of breast milk may be given every hour and the quantity of food and the interval between feeds may be gradually increased.

Intussusception.

This brings us to consideration of that most dramatic abdominal emergency, acute intussusception.

Here we have a healthy and happy child, quite free as a rule from any digestive disorder, unless perhaps he is recovering from an attack of infective diarrhœa.

The great majority of cases occur in children between six months and two years of age, and boys are more often affected than girls. Twenty-three children have been operated on for this condition at the Hospital for Sick Children, Brisbane, in the last nine years (see Table II). The one death which occurred in this series was due to gangrene of the caecum following successful reduction.

This condition, the invagination of one portion of the bowel into another, almost invariably a descending invagination, is by far the commonest

TABLE II.

Hospital for Sick Children, Brisbane: Intussusception Statistics for Nine Years.

Age.	Number of Cases.	
Five months	1	
Six months	3	
Seven months	2	
Eight months	4	16
Nine months	—	
Ten months	4	
Eleven months	2	
One year to two years	3	
Two years to three years	nil	
Three years to four years	2	7
Four years to five years	nil	
Over five years	2	

cause of intestinal obstruction in children, and its early recognition and treatment are of vital importance. The three layers are called the entering, the returning and the receiving; the two inner layers are the intussusceptum and the outer one the intussuscipiens. The tip of the intussusceptum is the "apex" and the proximal part of the intussuscipiens is the "neck" (Figure II). Various types occur, but my experience is that almost all start at the ileo-caecal valve or just proximal to it.

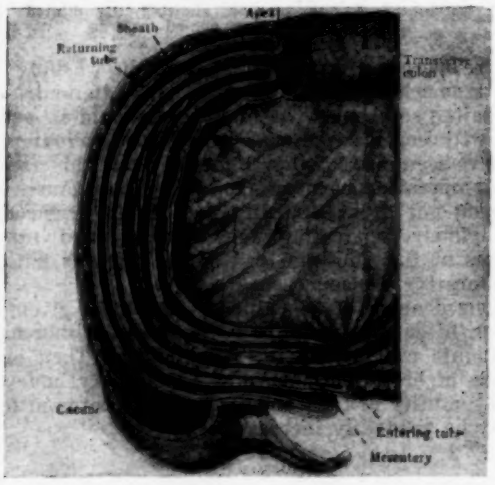


FIGURE II.
Diagram of intussusception (modified from R. C. Coffey).

The ætiology is best considered from the point of view of age incidence. Probably as a predisposing cause we have an error in development or structure of the visceral sympathetic system. Transient diarrhœa and dietetic errors as exciting causes are very likely to occur during the post-weaning stage, which is the time when intussusception is most common; again, collections of lymphoid tissue in the wall of the bowel in the ileo-caecal region are most pronounced during this age period, and swollen Peyer's patches may act as a foreign body and be the exciting cause of the invagination.

Unless spontaneous reduction occurs—a rare occurrence—pathological changes quickly manifest themselves. Obstruction of the thin-walled veins of the stretched mesentery leads to acute venous congestion of the intussusceptum, followed eventually by arterial failure and gangrene of the affected bowel. Organismal infection rapidly spreads to overlying peritoneum and fatal peritonitis develops.

The history generally given is that the child was quite well, when he suddenly got a severe attack of abdominal pain and screamed lustily; this attack passed off fairly quickly and was succeeded by less severe attacks of colic and possibly some vomiting; in between the attacks the child lay fairly quiet. Quite often one is lucky enough to get a history of the passage of blood and mucus from the anus.

The general appearance of the child is striking: he lies quietly in bed between the attacks of pain and looks shocked and anxious.

On palpation the abdomen is quite soft and the characteristic rounded or sausage-shaped tumour may be felt; if the clinician is in doubt, an anæsthetic should always be given, as palpation of the tumour is almost pathognomonic. Rectal examination may reveal blood and mucus on the examining finger. The presence of an appreciable amount of fæces in the rectum negatives intussusception, except in the very early stages of the illness. In advanced cases the apex of the intussusceptum may be felt by the examining finger in the rectum.

It is well to remember that in cases starting well up in the ileum blood may not be passed *per rectum* for some time. In doubtful cases I place most reliance on finding the tumour, and search for it painstakingly when the child is under an anæsthetic.

Acute entero-colitis in an infant may sometimes simulate intussusception, for colic and the passage of blood and mucus occur in both conditions. Also remember that an intussusception with the apex well down in either flank in the region of one of the flexures is often difficult to palpate. The crucial point in the diagnosis is whether complete intestinal obstruction is present or not. The presence of bile in the blood and mucus on the napkin after the first motion or two is strong evidence in favour of entero-colitis, and a persistently raised temperature and the vomiting and diarrhœa at the onset will always clinch the diagnosis.

Henoch's purpura, one of the hæmorrhagic diseases of children, is said to cause difficulty in the diagnosis. It is, however, a very rare condition, and if one remembers that it generally occurs in children of four years or over, that the tumour, when present, is fixed in position, and that petechial spots will be found on the skin, no mistake is likely to occur.

Finally, prolapse of the rectum may be confused with an intussusception that has reached the anus. The differentiation is quite easy, however, as in intussusception a finger can be swept completely round the protruding tumour, between it and the rectal wall.

From time to time one reads accounts of successful treatment of intussusception by means of rectal injections, and considerable success has been

achieved with this method. It is my conviction, however, that the risk of operation is so slight and reduction of the invagination under direct vision so satisfactory that surgical interference is indicated immediately the diagnosis is established.

Generally even advanced cases can be reduced easily until the apex has to be passed out through the neck; if there is difficulty at this point, wrapping the swollen bowel in a hot towel and squeezing firmly for some minutes nearly always make complete reduction easy.

Various methods are employed for dealing with the irreducible cases, in which the mortality rate is very high; they are, however, extremely rare, none occurring in our series of twenty-three.

In irreducible cases Brown's method of reduction may be tried; one blade of a pair of scissors is inserted on the flat between the entering and returning layers, and the constricting circumference of the neck is cut through for a short distance; reduction is then completed and the incision in the bowel is carefully closed.

Maunsell's method consists in uniting the entering layer and the edge of the receiving layer with a continuous suture, opening the receiving layer with a longitudinal incision on the anti-mesenteric border and drawing out the intussusception by the apex; as much as possible of the projecting mass is cut off. A continuous button-hole suture is made to encircle the stump, which is then pushed back into the lumen of the bowel; the longitudinal incision in the receiving layer is closed and patched with omentum, if available.

In dealing with abdominal pain in children over two years of age one cannot do better than follow the differentiation of Rendle Short,[1] who divided cases into two main groups: those with and those without diarrhœa.

The cases with diarrhœa are due, with few exceptions, either to dietetic indiscretions or to bacterial irritation of the bowel. One need do no more than mention the large group of infective diarrhœas, for this condition is usually easy of diagnosis, and the question of its treatment is outside the scope of this paper.

Unusual causes of abdominal pain associated with diarrhœa are abdominal tuberculosis and primary pneumococcal peritonitis, both rare diseases in Queensland.

Abdominal Tuberculosis.

Not more than seven or eight cases of abdominal tuberculosis appear in the records of the Hospital for Sick Children, Brisbane, during the last nine years. In one of these, which was an advanced case, the patient was discharged relieved, and inquiry reveals that he is now a robust, twelve-year-old boy. Another patient admitted was a child, four years old, whose history is worth giving in some detail, for in making a diagnosis there is always a tendency for us to disregard completely the possibility of conditions which are uncommon in our particular country or district.

G.S., aged four years, was admitted to hospital with a history that he had been quite healthy until four months previously, when he complained of a lump in the neck and of abdominal pain, which had become progressively worse and was persistent at the time of his admission. Anorexia was present, there was some vomiting and the bowels were regular. Examination revealed a very sick-looking child with a mass of enlarged cervical glands on the left side; on palpation of the abdomen there was diffuse tenderness and guarding, and a large mass was palpable in the midline. The Wassermann test gave no reaction. Death ensued shortly after admission. The *post mortem* report stated that several masses of enlarged glands were found in close relation to the vertebral bodies; the terminal portion of the ileum and caecum was thickened and numerous abscesses were present in the bowel wall. A pure culture of tubercle bacilli (bovine strain) was obtained from a portion of tissue removed from the caecum.

Primary Pneumococcal Peritonitis.

Cases of primary pneumococcal peritonitis are also rare in Queensland, two cases only appearing in our hospital records in the last ten years. This rarity is mainly due to the absence of densely populated slum areas in our towns, for primary pneumococcal peritonitis is a disease which affects young girls from two to ten years of age, who live in squalid and unhygienic surroundings. The condition manifests itself as a pelvic peritonitis following infection of the Fallopian tubes, and in unfavourable cases progresses to general peritonitis and septicæmia.

This brings us to consideration of cases of abdominal pain without diarrhœa in children over two years of age.

Appendicitis.

Fortunately it is now more generally recognized than in the past that children are not immune from the ravages of appendicitis, and cases of abdominal pain in young children are looked on with more suspicion than they were even in my youth.

The fact remains that each year hundreds of children are hastened to an early grave owing to the still prevalent idea that all stomach aches are due to over-eating and call for a large dose of oil. Nothing is more calculated to convert a mild appendicitis into general peritonitis than the early and free administration of purgatives.

Appendicitis, while very rare before the second birthday, is not unknown in infancy. Professor Fraser,[2] of Edinburgh, recalls four cases in babies still on the breast, and quite recently a case of appendiceal abscess in a child sixteen months old, with recovery following operation was reported in *The British Medical Journal*.

An analysis of 500 cases at the Royal Hospital for Sick Children, Edinburgh, showed that the incidence of the disease increases steadily with advancing age (Figure III).

Investigation of the age incidence in 265 consecutive patients operated on at the Hospital for Sick Children, Brisbane, demonstrated this fact in even more striking fashion (Figure IV).

The rarity of the disease in infancy and the increasing frequency in older children are partly explained by the fact that there is practically no

lymphoid tissue in the submucous coat of the appendix at birth, and very little during the first year; after this it increases steadily in amount. Probably this immature lymphoid tissue has a low resistance to infection, and the appendix, instead of being a strongpost well able to resist enemy organisms,

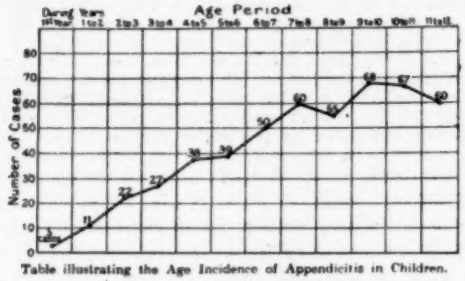


FIGURE III.

becomes a weak salient exposed to their raids and a vantage point in which they can establish themselves preparatory to launching an attack on the peritoneal cavity itself.

Again, as Fraser[2] points out, it is an established fact that the *Bacillus coli communis* is an organism of very mild virulence at birth and during infancy, but as the diet becomes more varied and attacks of enteric catarrh occur, its virulence becomes steadily more pronounced.

Carey[3] has pointed out the similarity that exists between the lymphoid tissue of the tonsils and the lymphoid tissue of the appendix, and claims that inflammation of the tonsillar tissue may be accompanied by a similar reaction in the appendix. In support of this contention he states that epidemics which involve the upper respiratory passages are associated with an increase in the incidence of acute appendicitis.

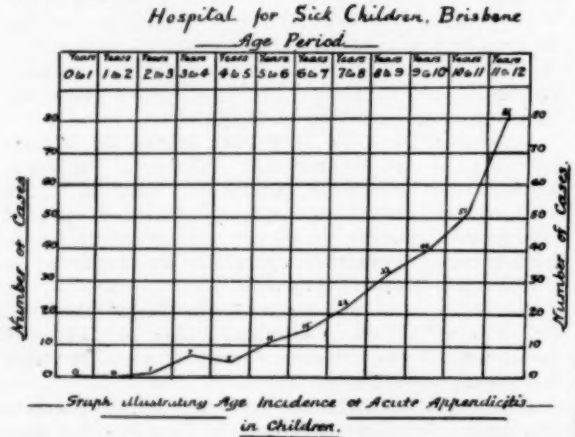

Hospital for Sick Children, Brisbane
Age Period
Number of Cases
Graph illustrating Age Incidence of Acute Appendicitis in Children.

FIGURE IV.

The pathology differs from that of appendicitis in adults in two main points: the thinness of the wall of the appendix allows a rapid spread of the infection to the peritoneal surface, and the protective omentum is relatively thinner and shorter than in adults. It follows, therefore, that general rather than local peritoneal involvement is to be expected in unfavourable cases, and that, if localized abscess formation does occur, secondary rupture into the general peritoneal cavity may be confidently expected. For this reason the Ochsner-Sherren method of expectant treatment in late cases is not advocated as a routine procedure in children.

The rapidity with which general peritonitis can develop is well shown by the following case.

L.B., aged nine years, thirty-six hours before admission to hospital ate two small mangoes and thought he swallowed the seed of one. He felt ill soon afterwards and developed abdominal pain and vomited; the pain was mostly about his umbilicus and he vomited several times between the onset of pain and admission to hospital.

On examination his breathing was almost entirely thoracic; generalized abdominal rigidity and tenderness on pressure were present; no mass was palpable.

Immediate operation was performed through a paramedian incision; the abdomen was full of thin pus; the appendix, which was not walled off, was gangrenous at the distal end and had a small perforation. The appendix was removed; two tubes were inserted, one suprapubically into the pelvis and one in the right flank, draining the paracolic area; the temperature became normal on the sixth day and the child made an uninterrupted recovery.

In a typical acute case the clinical picture differs little from that of appendicitis in adults; there is the classical history of epigastric or umbilical pain, or sometimes pain all over the "stomach", followed by vomiting and later localization of the pain in the right iliac fossa. At this stage the temperature is generally in the region of 38·3° C. (101° F.) and only very occasionally exceeds 38·9° C. (102° F.).

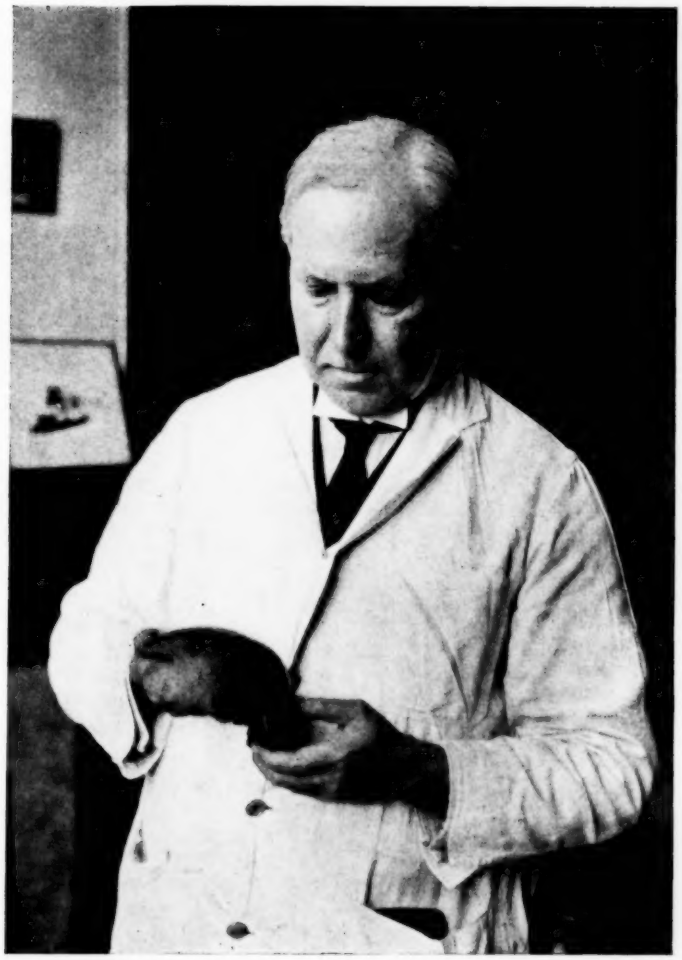
Cases are seldom seen before the pain is thus localized, but every effort should be made to get an accurate account of events from the very onset of the illness.

Careful abdominal investigation reveals tenderness on pressure in the right iliac fossa; guarding on pressure is frequently very pronounced in children, but true muscular rigidity is absent unless the parietal peritoneum is already involved.

Skin hyperæsthesia is, I find, a valuable sign, and a pin run lightly over the skin will often reveal a sensitive area of varying extent on the right side, between the umbilicus and the inguinal ligament. Low hyperæsthesia in this area is suggestive of very early pathological changes, while high hyperæsthesia is suggestive of the fact that the inflammatory process has already spread to the peritoneal coat of the appendix.

Bimanual rectal examination should never be omitted, though I find this more difficult in children than most of the text-books would have us believe. A white cell count and Arneth count are useful adjuncts in cases which have to be distinguished from alimentary colic without any inflammatory reaction.

Most difficulty in diagnosis is experienced when the appendix lies in an abnormal position, and the



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possibility of this should always be remembered in doubtful cases.

Pelvic appendicitis often gives rise to great difficulty in diagnosis; low initial pain, painful and frequent micturition in the absence of pyuria, a positive obturator sign or suspicious abdominal distension may give the clue.

Do not forget that a pelvic abscess may form, remain latent for several days and then suddenly rupture and cause rapid general peritonitis.

Bimanual rectal examination is really of great value in this type of case; it is often the sheet anchor, and if any doubt exists, it may be done daily under light anæsthesia.

In retrocaecal appendicitis vomiting is generally absent owing to non-involvement of the peritoneum, and the close proximity of the appendix to the retroperitoneal muscles may produce a positive result to the psoas test; pain and tenderness in these cases may be referred to the loin.

I remember a case in which I did an exploratory lumbar incision, expecting to find a retroperitoneal abscess; the kidney was exposed and no inflammatory focus was located, but incision of the peritoneum over the lower pole of the kidney revealed a large abscess cavity, and a fæcolith presenting in the wound solved the problem; drainage by the lumbar route was quite successful.

When the appendix lies in close relationship to the mesentery of the terminal part of the ileum, vomiting is early and persistent, and obstructive symptoms develop rapidly; this type is fortunately rare.

In some cases of imperfect descent of the caecum the appendix may actually be located in the neighbourhood of the pylorus and an upper abdominal lesion is simulated.

Differential Diagnosis.—In this regard some of the more common causes of confusion in children are worthy of mention.

Acute pyelitis may cause some difficulty. A female child complains of vague abdominal pain, vomits and has a rise in temperature. Remember that dysuria and frequency of micturition may not be present and microscopic examination of urine should not be confined to patients having these symptoms.

The high temperature and sudden onset, often accompanied by a rigor, are suggestive features as well as the early constitutional disturbance and mental irritability. Microscopic examination of the urine reveals pus cells and motile bacilli, and clinches the diagnosis.

Remember, however, that a few scattered pus cells in a centrifugalized catheter specimen of urine are not sufficient evidence on which to base a diagnosis of pyelitis in the absence of other clinical evidence.

Cyclic vomiting is a condition the age incidence of which more or less coincides with appendicitis. In a clasiscal case the early onset and persistence of vomiting and the presence of headache and the absence of abdominal pain, or its mildness, if present, make the diagnosis easy. Again, a history of frequent previous attacks of a similar nature, generally induced by some unusual excitement, often gives the clue. Considerable difficulty may be experienced when the vomiting is less pronounced than usual and the abdominal pain is more pronounced; the pain, however, remains in the umbilical area, and tenderness, if present, is somewhat vague and never localized; in these doubtful cases oral and rectal or even intravenous glucose administration will generally effect a rapid improvement. Careful observation and repeated examination will invariably prevent an error in these cases.

Pneumonia may be associated with abdominal pain and in certain cases may be easily mistaken for appendicitis, a difficulty encountered more frequently in children than in adults. One must guard carefully against an error which will submit a patient with early pneumonia to an anæsthetic for removal of a normal appendix. In cases associated with diaphragmatic pleurisy careful examination of the chest may reveal pleural friction, but the pneumonic area is not always basal, and all chest signs may be absent.

A history of sudden onset of pain with a high temperature and the absence of localizing tenderness, although the pain persists, make one suspicious. An increased respiration rate and diminished pulse: respiration ratio, with some dilatation of the *alæ nasi*, will serve to distinguish a supradiaphragmatic from an abdominal lesion.

N.H., aged two years and eleven months, was ill for four days prior to admission to hospital; the illness commenced with moderately high fever and vague but persistent abdominal pain; when the child was seen on the second day its general condition was suggestive of an early pneumonia inasmuch as she was slightly dyspnœic and had a suspicion of dilatation of the *alæ nasi*; next day, however, these signs had disappeared and physical examination was negative in every way. Abdominal pain, however, persisted without any localizing tenderness, and the daily temperature ranged from 38·3° to 39·4° C. (101° to 103° F.).

On the fifth day the percussion note seemed a little impaired at the right apex, with a corresponding slight increase in vocal resonance.

An X ray examination on the child's admission to hospital revealed a localized patch of pneumonic consolidation in the right upper lobe; early next morning the temperature dropped to 36·1° C. (97° F.) and remained normal thereafter.

Catarrhal jaundice, which is most prevalent from five to nine years of age, is hardly likely to cause any confusion, though upper abdominal pain, sometimes severe, is present for several days before jaundice appears.

Plumbism is a possibility which must never be lost sight of in Queensland. The abdominal pain is colicky and spasmodic in nature and is referred to the umbilicus; also there is additional evidence of lead poisoning in chronic constipation, anæmia and gross basophilia.

Thread-worm colic is in a different category. Here the attacks of abdominal pain often persist in spite of treatment and at times lead on to what appears to be an attack of appendiceal colic, if not actually mild appendicitis.

On occasion I have not hesitated to operate in these cases, and on exploring the appendix after removal one may confidently expect to find anything from one to twenty thread-worms in the lumen; the discovery of thread-worms in an appendix makes operation justifiable, as I am convinced that these patients always develop ultimately an acute infective appendicitis.

Occasionally one is confronted with a case in which there is a definitely palpable and tender mass in the right iliac fossa, with a positive psoas sign, moderate temperature and some general malaise. Do not rush headlong into a diagnosis of appendiceal abscess, for careful investigation may reveal impetiginous sores on the right leg with some tender, deep subinguinal glands; the mass is an abscess lying retroperitoneally on the ileo-psoas muscle and is secondary to pyogenic infection of the external iliac lymphatic glands.

Osteomyelitis of the ilium tends to reach the abdominal surface of the bone and to give rise to an abscess in the same location.

Again, a circumscribed swelling may appear in the right iliac region associated with abdominal pain, but careful palpation will demonstrate the superficial nature of the swelling; incision will reveal a localized abscess, situated between the muscle layers of the abdominal wall.

Every now and then we are confronted with some unusual condition which draws a red herring across our path and which leads us to the erroneous conclusion that we are dealing with an acute appendicitis.

Some years ago I was called to see a small girl, three years old, who complained bitterly of abdominal pain; she had a moderately high temperature and had vomited several times. On examination there was marked lower abdominal tenderness and guarding, and although she was being treated for gonococcal vulvo-vaginitis, the possibility of a pelvic appendix was so great that immediate laparotomy was performed. The appendix was absolutely normal; both tubes were acutely inflamed, although quite patent, and they were left strictly alone; she made a good recovery, and up to the age of sixteen has had no recurrent trouble.

Other possible, though in our experience very rare, causes of abdominal pain are peptic ulcer, cholelithiasis and spinal caries.

Treatment.—Operation should never be delayed once the diagnosis of acute appendicitis is made. In early or mild cases the McBurney incision is the one of choice; in more severe or later cases a pararectal incision may be used with advantage. Postoperative hernia with any incision is extremely rare if the wound is properly closed in layers.

Invagination of the stump is always advisable, and a second invaginating suture may be used to bury the stump more firmly.

Great care should be exercised in handling the tissues, as juvenile peritoneum is very thin and tears easily.

In cases of localized abscess formation "packing off" should be done most carefully, and care should be taken to prevent protective adhesions from being broken down; if any difficulty is likely to be experienced in removing the appendix in these cases, it is much better simply to provide adequate drainage and to leave the appendix undisturbed until a later date.

Children do not stand closure without drainage as well as adults. If pus is present, a tube should always be passed down to Douglas's pouch as well as one to the appendix area. The tube to the pelvis is best passed through a suprapubic "stab" wound and should be shortened and removed as the occasion demands, but never completely removed and then reinserted.

In our series there were 13 deaths in the 265 cases, a percentage mortality comparable with that in other and larger series; all the deaths, with one exception, took place in children who had been ill for more than two days prior to admission to hospital.

Seven of the deaths occurred among the 61 patients under eight years of age (11·5%) and six of the deaths among the 204 patients over eight years of age (3%).

These figures confirm the generally expressed opinion that the younger the child, the more serious is the prognosis.

In one short paper it is impossible to cover with any degree of adequacy the whole subject matter of this question of subdiaphragmatic pain in children. I have made an attempt, however, to bring to your notice the value of careful clinical investigation in all cases of abdominal pain, however trivial, and above all else to keep alive in your minds the ever-present possibility of sudden inflammation of the appendix in childhood, with the dire consequences attendant on delayed or mistaken diagnosis.

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ON SOME ASPECTS OF THE DIAGNOSIS OF INTRACRANIAL TUMOURS.[1]

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THE statement has been made by no less an authority than Harvey Cushing that the cranial cavity is one of the most common sites for tumour development. This statement at first appears a little incredible, as it is the experience of most clinicians that intracranial tumours are rare. Likewise it had been with Cushing, who in his early surgical life spent six months in Kocher's clinic in Berne, during which time he saw only one intracranial tumour treated. In contrast to this, however, he was able later in life to publish the reports of 2,000 of his own cases of intracranial tumour.

[1] A post-graduate lecture delivered in Sydney, June, 1936.

We are confronted, therefore, with the probability that intracranial tumours are indeed more frequent than we generally realize, and that they may commonly be missed. As on investigation we find that in the histories of most intracranial tumours there is an account of fairly long observation and treatment along mistaken lines before the final correct diagnosis is arrived at, and as patients with intracranial tumour who have mental disturbance will not infrequently have deceived the psychiatrist, those having ophthalmological disturbance the ophthalmologist, and those with nervous symptoms the neurologist, one is forced to recognize that the scent of the tumour is not always easy to pick up in its early stages, and may frequently elude the diagnostician until the end.

It is, however great the difficulties, highly desirable that the possibilities should be realized though the diagnosis may in the early stages be difficult to prove; therefore in dealing with obscure symptoms one should always have the possibility of intracranial tumour in mind. Undoubtedly the greatest difficulty is that most of us have grown up with an entirely false idea that it is only when we are confronted with headache, vomiting and papillœdema that we should think of intracranial tumour.

True, indeed, when confronted with such a picture, one does think of intracranial tumour, but rather as one thinks of intestinal obstruction when confronted with vomiting, absolute obstruction and distension. If we were to delay diagnosis of intestinal obstruction until we had obtained these signs, we should all too frequently wait for death.

In this discussion I propose to analyse these three symptoms, and then to proceed to a short account of all the other protean ways in which a tumour may early manifest its presence and often run its entire course without the occurrence of all or any of the three symptoms mentioned.

Headache.

Headache is undoubtedly the symptom of paramount importance. It is so often the overture of a cerebral tumour that on this symptom alone a case should be suspected and investigated. In looking over records that I collected recently at the London Hospital, I find that in fifty consecutive cases of intracranial tumour nineteen patients had headache as the initial symptom, causing them to seek advice. The headache has varied manifestations. It may be localized or generalized, constant or spasmodic. It may vary in intensity from being almost unbearable to a mild ache only remembered on specific inquiry.

An example of a case without headache, but with a large tumour, is that of a man, aged sixty years, who was admitted to Saint Vincent's Hospital under my care, completely paralysed on one side, with a homonymous hemianopia and other gross signs. He had never had any headaches, but he was found to have an enormous meningioma. It would be easy to quote many such cases. For instance, headache practically never occurs in pituitary chromophobe adenomata until considerable intracranial extension has occurred.

It is very difficult sometimes to make a satisfactory association between the type of pain and the nature of its cause. It may at times be due to local changes such as that occurring in the region of an underlying meningioma, or it may be due to a general increase in intracranial pressure. The latter type of pain is generally most severe in the frontal region, though occasionally it is localized to the occipital area. The pain in the back of the head and neck is apt to be affected by movement, and we often find that the patient will learn little tricks of posture to relieve it, or sometimes hold his head in a fixed attitude peculiarly characteristic of cerebellar tumours. The character and nature of the pain may be altered by interference, such as an ill-advised lumbar puncture, which may immediately precipitate the most intense persistent occipital and nuchal headache.

It is important to remember that, though headache may be an important initial symptom, it not infrequently becomes a much less dominant feature as the disease progresses. This is apt to be a particularly common sequence in the posterior fossa tumours of children. These so often commence with headache, which the little patient learns to relieve by avoiding the slings and arrows of his surroundings, so adapting himself to his altered intracranial conditions as to simulate for a time a great measure of recovery. Most headaches due to intracranial tumour are apt to be exaggerated by such things as constipation, straining, changes in the weather, irritations or anxiety, and it is because these factors are so under control in hospital that patients often become more comfortable after admission.

Headache may then be said to stand on its own merits as a sign of such importance that, if it cannot otherwise be explained, the patient should be treated for a period of observation and investigation as a tumour suspect.

Vomiting.

As an initial clinical feature, vomiting is of far less importance than headache. In fifty cases, three patients only showed it as the first symptom, and only in twenty-one cases did it appear at some period of the history. It is important to remember that vomiting due to intracranial tumour is not always unaccompanied by nausea, and is by no means always of the projectile type. Vomiting as an early symptom is fairly characteristic of posterior fossa tumours, and it thus happens that the doctor's attention is early centred on the digestive system, and not infrequently ineffectual abdominal operations punctuate the full development of the picture. The inaction or misguided action which may thus be born of such diagnosis as "bilious attacks" may often postpone the recognition of an intracranial tumour for too long. This is so in those cases of cysts of the cerebellum in children in which the early picture is almost purely one of recurrent attacks of vomiting, often leading to the removal of the appendix.

Papilloedema.

No greater false teaching was ever promulgated than that papillœdema should be a *sine qua non* to the diagnosis of intracranial tumour. In these

fifty cases it was present in thirty-three. Papillœdema, which is due to an increase in pressure in the fluid in the sheath of the optic nerves, may be the result of a general increase in intracranial tension, or may be a phenomenon due to some local cause. Papillœdema may thus be unilateral or bilateral, and equal or unequal in degree. As a positive sign, its importance cannot be over-estimated, but its absence has little significance from the point of view of diagnosis. It is apt to be an early sign in tumour of the posterior fossa in which blockage of the aqueduct occurs, but on the other hand some posterior fossa tumours may run a long course without its appearance; and I recently operated on a patient with a tumour of the third ventricle who had considerable internal hydrocephalus, but no papillœdema. Supratentorial tumours may grow to a considerable size and cause great local damage without the appearance of fundal changes. Meningiomata often cause a degree of choked disk out of proportion to their size, but on the other hand, in a series of nine consecutive cases it was absent from three.

When papillœdema is present, it is not only a sign of importance, but a warning of some urgency. Though the degree of papillœdema is an important observation, it is the resultant diminution of visual acuity which should act as the real indicator of urgency. When papillœdema is present, it signifies greatly disturbed intracranial balance, and portends permanent damage to eyesight.

It must also be remembered that optic neuritis may be due to other causes, and hasty conclusions drawn from it may prove fallacious. It is as well to suspect that a high grade papillœdema with early and considerable loss of acuity, but unaccompanied by other signs of intracranial pressure, is probably not due to tumour.

Other Common Symptoms.

I shall now go on to a more or less random consideration of some of the more important and common early presenting symptoms which may be amplified by clinical investigation and lead to a positive and early diagnosis of tumour.

It will be convenient to consider, in order, the disturbances which may be referable to the cranial nerves.

Anosmia.

As an example of the importance of loss of smell, I shall quote the case of a patient, aged fifty-nine years, admitted to hospital in July, 1934.

She had lost her sense of smell in 1918. In the following year it was observed that her personality was altering, and she was subject to alternate attacks of hilarity and depression. It was not until ten years later that she complained of severe headache and failing vision. Her sight then became so quickly impaired that she was soon unable to read, and at the time of her admission to hospital perception of light only remained.

Her alteration in personality had steadily progressed, and during the past two years her memory had become very defective. For one year she had had organized visual hallucinations, seeing beautiful churches, fountains *et cetera*. During the long period of her illness she had consulted many doctors and been in and out of several hospitals. Her general health had not deteriorated. On examination, we found that she had absolute anosmia at the left nostril and considerable loss at the right. Perception of light was absent from the left eye and was present in the right. Optic atrophy was present in both disks. Further examination revealed no abnormality. X ray pictures showed some thickening at the base of the anterior fossa. Contradictory histories and the rather indefinite X ray findings led to some difficulty in diagnosis. During investigation the patient had a series of fits, and eventually became comatose and died. Autopsy revealed a large olfactory groove meningioma.

This was an instructive case, showing as it did how for years the patient had spent much time in hospitals; moreover, the significance of her three primary symptoms of loss of smell, mental change, and optic atrophy had not been fully appreciated by specialists in these branches.

Defects of Vision.

Defects of vision are a common enough symptom, and in the case of tumours in the region of the optic chiasm may be the only symptom. The patients may notice either loss of acuity or defects in the fields. Often they will note that they bump into things on one side. A careful nursemaid pushed the perambulator containing her precious charge into a 'bus. An old patient of mine, having climbed on to a roof, noted that he could not see where to get down. His skiagram showed an enlarged sella, and a pituitary adenoma was removed. His sight has been good since then. I recently operated on the wife of a clergyman, who first noticed that while her husband was preaching and waving his arms, as he moved on one side, she would lose sight of his hand.

In all such cases the careful investigation of the fields of vision is of the greatest importance, and here it must be stressed that the fields must be meticulously worked up on a Bjerrum screen; the ordinary perimeter frequently misses the significant field defect.

A girl, aged nineteen years, consulted an ophthalmologist because of lack of sight. At first he could not understand why she could not see, and was inclined to regard her as hysterical, until a vision field betrayed a well advanced bitemporal hemianopia. I found at operation a large cyst pressing on the chiasm, relief of which resulted in restoration of her vision.

Primary optic atrophy of otherwise unknown origin is usually a surgical condition.

Diplopia may be an early symptom, and always demands investigation.

The Fifth Nerve.

The fifth nerve occasionally gives the alarm, in the way of neuralgic pains or anæsthesia. I have seen two patients in the last year whose early symptoms were referable to the fifth nerve.

The Eighth Nerve.

Tumours of the eighth nerve form a fair proportion of intracranial tumours, but their onset and development are so insidious that they may easily be missed. The typical picture is tinnitus, and deafness of slow development and often long standing, later associated with seventh and fifth nerve signs, cerebellar ataxia, and finally with the signs of internal hydrocephalus, that is, papillœdema and headache. It may happen that the patient, friends and doctor all accept the old-standing deafness as a sign of no importance, whereas it may be the crux of the diagnosis.

Such a case was that of a man of sixty years who was sent to me in a state bordering on coma. He had been deaf for a few

years, but nobody made any note of that. We were unable at that time to make a correct localization, and in the course of time he died and at *post mortem* examination a large eighth nerve tumour was discovered.

The other cranial nerves seldom give the alarm, but are of course frequently affected in a secondary way.

Weakness or Paralysis.

Weakness or paralysis of the limbs may often dominate the picture. Typically, this is of gradual onset and steady development, and if the left side is affected, there may be no other accompanying symptoms. The danger here is that such a case may be attributed to some strange vascular or degenerative condition.

Occasionally sensory phenomena such as tingling and pins and needles in the limbs may be noted early. One patient of mine noted as almost his first symptom loss of sense of position. He would find that he had literally to look for his left hand, and would often find it tucked into his trousers, left there and forgotten after he had fixed his shirt. This man had a tumour in the post-Rolandic area.

Likewise, in tumours of this region the patient himself may note that he is unable to recognize objects by touch in one hand—" astereognosis ".

Fits.

Fits of various kinds may be the earliest or the dominant sign of intracranial tumour. These may be of a motor or sensory character. Motor fits may range from minor manifestations without loss of consciousness to major epileptiform seizures. It is needless to emphasize that epilepsy commencing in the adult should arouse keen suspicion of some demonstrable causal lesion such as a tumour.

I had the opportunity of seeing a man who for four years had been suffering from epileptiform fits with loss of consciousness. At the end of this time he developed headache and papilloedema, which called for full investigation. A large parieto-occipital glioma was found and removed at operation.

Attacks of spontaneous loss of consciousness without motor phenomena usher in many of the pictures of tumour.

Sensory fits such as " uncinate fits", in which the patient is overcome by a sense of some extraordinary odour, are very characteristic of tumours in the region of the uncinate gyrus, and may be the only symptom.

Abnormal sensations of sight and abnormal sensations of numbness or " pins and needles " in the limbs may likewise have deep significance.

Disturbance of Balance or Gait.

Disturbance of balance or gait may be very important signs.

There was the case of a male child, aged nine years, who complained that about two months prior to his admission to hospital he commenced to stagger about when he was walking. He tended to stagger to the right, and if he stopped, he would fall. This stagger steadily got worse until about three weeks prior to admission, when he had to be supported while walking. For one month he had complained of occasional right frontal headache. Occasionally vomiting accompanied this headache. This latter part of the history was obtained from his parents, he himself stating that he did not suffer from headaches. He said that his sight was bad.

On examination we found a bright intelligent lad, whose head was slightly enlarged and gave a definite " cracked pot " sound on percussion. He had a bilateral papilloedema, and his acuity was good. There was a coarse lateral nystagmus and a slight bilateral external rectus weakness. There was a slight right-sided lower facial weakness. He fell to the right when standing and walked on a wide base, with his head carried forwards. He had a slight ataxia and dysmetria and severe hypotonia. The right plantar reflex was extensor.

A diagnosis of vermis tumour was made and a cerebellar exploration was performed. A vermis medulloblastoma was found. A decompression was made and the child was referred for X ray examination in view of the fact that these tumours are not favourable for surgical removal.

Giddiness may be a most important symptom. In the series discussed, six patients complained of dizziness and giddiness as the initial symptom. The following case is an instructive example of this group.

This patient was a woman, aged forty-seven years. One year prior to her admission to hospital she had commenced to complain of attacks of giddiness, especially on getting out of bed in the morning, though they did not occur every day. These attacks lasted only a few minutes, and she had never lost her balance. Later she had a severe attack, lasting constantly for about three weeks. She could not move in bed without precipitating violent giddiness accompanied by vomiting. After ten weeks the giddiness entirely subsided and she has not been troubled by it since.

About eight weeks prior to her admission to hospital she commenced to complain of severe headaches which started in the back of the neck and radiated forward. These were spasmodic and irregular. During the past few weeks her walking had been unsteady, and though she had no tendency to fall in any particular direction, she walked with a stick. For some time her chief complaint had been a feeling of listlessness and powerlessness to set herself to any task.

On examination she was a healthy well built woman with no general signs of disease. There were no fundal changes. There was slight nystagmus, slower and coarser to the right, a very questionable left lower facial weakness and slight reduction of the left corneal reflex. There was general hypotonia more pronounced on the left side, with diminution of the knee and ankle jerks. She stood in the " cerebellar attitude ". There were no other signs. A tentative diagnosis of cerebellar tumour was made and the posterior fossa was explored. It was surprising to find a very extensive ependymoma occupying the vermis and extending down over the upper part of the spinal cord and upwards into the aqueduct of Sylvius.

This was an extremely instructive case, emphasizing the importance of giddiness and spasmodic headaches as the only symptoms, and nystagmus and hypotonia as the only signs leading to a correct diagnosis.

Mental Symptoms.

Mental symptoms may often dominate the picture, especially in left-sided tumours. Often the mental degeneration is secondary to prolonged increase of intracranial pressure, and then is of the type of a general degeneration; at other times it is due to local brain damage, as in frontal and temporal lobe tumours. These are the cases which are particularly apt to elude correct diagnosis and to be put aside as cerebral degenerations or labelled some type of insanity. The following case is a good example.

A female, aged fifty-eight years, was complaining of unsteadiness in walking, and occasionally of fainting attacks. Her daughter stated that for about a year she had been losing interest in things. Having been a keen reader, she now never opened a book, her house, previously spotless, was now dirty and untidy. She had ceased to visit her many friends and had lost interest in some other social activities. Lately she had been prone to break into tears, and had suffered from severe headaches for about the same period. These attacks were frequent and spasmodic, but she had learnt how to relieve them by some little trick posturing of her head.

On examination she appeared healthy, but her attention was poor and her manner a little fatuous. She had a slight papilloedema, and a slight left lower facial weakness. Motor power was good, and equal on both sides. Her tendon reflexes were brisker on the right than left, and she had a bilateral palmar grasp reflex. There was slight defect of postural sense in the right big toe. X ray examination revealed signs of raised intracranial pressure. A tentative diagnosis of left prefrontal tumour was made, to confirm which ventriculography was performed. The left ventricle could not be entered, and air put into the right ventricle showed the left empty and the right considerably dilated, with the third ventricle displaced to the right.

A left-sided flap was turned down and a meningioma, five centimetres in diameter, adherent to the dura in the parasylvian region, was exposed. The tumour was successfully removed.

Her condition remained satisfactory, and about ten days later she was discharged from hospital. She was a changed woman, now having no headaches, feeling greater interest in events, and being conscious of an improvement in her memory. Still her cerebration was slow, but these were early days to look for a full measure of improvement.

Likewise, aphasias should arouse suspicion.

I saw a middle-aged man who was seized by a momentary fit of unconsciousness, after which he had a nominal aphasia for a few days. He then recovered. His physician advised a long holiday, during which he had several more similar attacks. After some months he commenced to complain of headache, and I was asked to investigate him. Ventriculography revealed a large left-sided tumour.

Euphoric states of mind such as "wise-cracking" are particularly suggestive of some frontal tumours.

Methods of Investigation.

I have devoted this space to elaborating the type of symptoms which should arouse suspicion of tumour. It would be wise, therefore, to finish by briefly indicating the methods by which suspects should be investigated.

First and of paramount importance is repeated painstaking clinical examination. As in all branches of clinical medicine, no special methods of investigation can displace this, and by it all other findings are given their proper value. This must include an examination of the fields of vision. This little investigation, done on a large black screen, is well within the powers of any clinician after a little practice.

X rays are a great source of information, both as to the presence and the nature of a tumour. Such plates may show the general signs of increased pressure or local signs of tumour, such as bone erosion and hyperostosis, both frequent findings overlying meningiomata, enlargement of the *sella turcica*, as seen in pituitary tumours, or pathological calcification as seen in certain gliomata and in suprasellar cysts. There are, in addition, many less positive appearances which, taken in conjunction with the rest of the picture, may be of great value.

I should like to stress the point that stereoscopic pictures should be taken, and that the radiographer and surgeon should combine their interpretative efforts.

We then have what might be called the special methods or final court of appeal, encephalography and ventriculography. Encephalography is the introduction of air into the subarachnoid space by lumbar puncture in such a way that it rises to the ventricles. Ventriculography is the introduction of air into the ventricles by direct ventricular puncture through small burr holes made in the skull.

In discussing these, it is most important to stress that they may both be highly dangerous techniques, even in the hands of those accustomed to their use.

If there is indeed real reason to suspect a tumour, fluid should never be withdrawn by lumbar puncture; this may precipitate disaster. If a tumour is suspected, it is better that ventriculography be performed. It has now many times been shown that this can safely be done only when the surgeon is prepared to go on with his operation immediately, and it is therefore an investigation for the surgeon only.

The question naturally arises as to whether it is worth while to be continually suspecting tumours and going to such pains to procure their diagnosis. Until the very near past the operative attack on an intracranial tumour was followed either by almost inevitable disaster or an apparently miraculous survival. Those days have passed. The modern methods of surgical attack have opened for the sufferer from this type of tumour a very reasonable prospect of cure, every hope of alleviation, and a danger of operative mortality very little greater than that encountered in any other branch of major surgery for malignant disease.

Though I feel that there is economically no place for exclusive specialists in this field in Australian cities with their small populations, it nevertheless behoves the surgeon who would deal with this type of work to take special pains to train himself in modern methods of investigation and technique, and to take upon his own shoulders the burden of diagnosis and localization as well as of operation, for without this the old tradition of death and failure will continue to be associated with the problems of intracranial tumours.

Acknowledgement.

I wish to acknowledge the debt I owe to Mr. Hugh Cairns, of the London Hospital, for the facilities I enjoyed in his department, in which I recorded many of the cases here discussed.

MEDICINE AND THE ARTS.

By LAURENCE DUNCAN,
Melbourne.

"MUSIC is the stalk and flower of health, and most remedial", wrote John Davidson; and medicine and music are often to be found together. The ancients gave them a common patron, Apollo, and physicians of old made use of the music of the lute and the harp as therapeutic agents, believing, like Bacon, that "the office of medicine is but to tune the curious harp of man's body and to reduce it to harmony". Medicine has a special interest in two great musicians, Händel and Berlioz. Händel's father was a physician, and attempted in vain to stifle the lad's predilection for music. Berlioz was intended by his father, a medical prac-

titioner, for the same profession, but gave up his career as a medical student, despite much parental opposition. One renowned physiologist, Claude Bernard, by a strange mischance, won the decoration of the Cross of the Legion of Honour, not as a physiologist, but as a musician. After Bernard's paper on the function of the pancreas was presented to the *Académie de Médicine* in 1849, Magendie urged his claims for special recognition on the Minister of Public Instruction. His name appeared on the honours list, but the official journal, by a curious misprint, announced that Claude Bernard had been named a Knight of the Legion of Honour for his valuable research on the musical (instead of medical) properties of the pancreas. The slip was rectified in a later announcement, but the fact remains that he was decorated not as a physiologist, but as a musician. It is said that subsequently, when Bernard was lecturing on the pancreas, he was always haunted by the fear of referring to its "musical" properties.

Among the members of the medical profession there have been many amateur musicians and lovers of good music. Twenty-five years ago there were in Paris and Vienna orchestras, numbering seventy members, composed entirely of doctors. Songs of doctor poets have been set to music. But as famous musical composers, medical men are rare. Thomas Campion (1567 to 1620), now known as a poet and forgotten as a physician, published songs of which he wrote both words and music. Henry Harington (1727 to 1816), who practised at Wells and Bath, founded the Bath Harmonic Society and was the author of many musical compositions. The tune of "Yankee Doodle" was composed in 1755 by a doctor, Shuckburgh, a surgeon in Lord Amherst's army. Alexander Campbell (1764 to 1824), a medical graduate of Edinburgh University, resigned medical practice for music and literature. He wrote songs and taught music, and among his pupils was Sir Walter Scott. William Henry Stone (1830 to 1891), physician to Saint Thomas's Hospital, London, was an accomplished musician and improved the double bassoon. Dr. T. B. Hyslop (1861 to 1933), late physician-superintendent at the Bethlem Royal Hospital, composed a number of musical works, including some orchestral pieces. Cecil Webb Johnson (1879 to 1930) practised in London, and was noted as a composer of waltz music. William Wallace (1860 to ——), an M.D. of Glasgow, who specialized in ophthalmology, has published collections of songs and orchestral works. Dr. Robert Bridges, the late poet laureate, was a cultivated musician. Francis Brett Young, better known as a novelist, is an accomplished musician and composer, and has written the music for the songs of Robert Bridges. Dr. Albert Schweitzer, medical missionary, philosopher and musician, is famed as a great organist and as one of the greatest authorities on Bach. Fritz Kreisler, the violinst, and the conductor, Maurice de Abravenel, were once medical students.

Many medical men who obtained great distinction in their profession at the same time cultivated some skill in music. Rhazes, the famous Arabian physician, began life as a musician, and was an accomplished performer on the lute. Jerome Cardan, of Milan, wrote a systematic work on music. Boerhaave was a student of music all his life. Joseph Leopold Auenbrugger, the discoverer of percussion, composed an opera called "The Chimney Sweep", which gave the Empress Maria Theresa so much pleasure that she asked him to write another. He replied that he had something better to do than to write operas. Parinaud, the celebrated French ophthalmologist, published a large number of compositions. Billroth, the famous surgeon, was a composer and an excellent performer on the piano and violin. In his boyhood he seems to have wished to take up music as a profession, but was prevented by his mother from doing so. He was an intimate friend of Brahms and Johann Strauss; he frequented the opera and the concert hall, gave musical soirées, and published a work on the physiology of music.

Leaders of British medicine have also shown their taste for music. William Withering, to whom we owe the use of digitalis in medicine, excelled at the flute and harpsichord. Jenner, the discoverer of vaccination, was fond of music and played the violin and the flute. Sir Richard Owen played the flute and violoncello; concerts and the theatre were his chief relaxation. In the latter half of the nineteenth century four doctors, Sir Robert Christison, Dr. Bennett, Dr. Maclagan and Dr. Peddie, were known in Edinburgh as the "Singing Doctors". They appeared together as glee and quartette singers not only at medical dinners and functions, but on several occasions at public concerts in aid of charity. Sir Felix Semon, the noted laryngologist, was an accomplished pianist and a composer of distinction.

It is not without significance that Saint Luke[1] is the patron saint of doctors and artists alike. There is an art as well as a science of medicine, the acquirement of which requires such zeal as to leave little energy or time for the pursuit of the fine arts. Still, the combination is not impossible, and many leading medical men have practised at the same time both medicine and the fine arts. Doctors should be attracted to art if for no other reason than medicine's debt to the arts. In centuries gone by the profession was greatly indebted to artists for the effective illustration of anatomical, medical and surgical works. For the physician Marcantonio della Torre of Padua, Leonardo da Vinci made numerous drawings to illustrate an anatomical treatise. The illustrations which appeared in Thomas Willis's famous *"Cerebri Anatome Nervorumque Descriptio et Usus"*, 1664, were engravings by Sir Christopher Wren, the designer of Saint Paul's Cathedral and eighteenth century London. George Stubbs, the great animal painter,

[1] There is a tradition that Saint Luke was a painter as well as a physician; in the Vatican there is a portrait of Christ attributed to him.

began his career as an artist by making a series of eighteen drawings for Dr. Burton's "Essay Towards a New System of Midwifery". Again, the doctor has been immortalized in art by various painters: by Rembrandt,[1] in his celebrated picture of the physician Van Tulp demonstrating the muscles of the arm in the anatomical theatre in Amsterdam; by Sir Joshua Reynolds, in his great portrait of John Hunter; and by Sir Luke Fildes, in his well-known picture, "The Doctor", which was the popular feature of the Royal Academy, 1891, and now hangs in the Tate Gallery. It portrays a physician sitting in a cottage and observing, with earnest thought, a sick child. Sir Luke's explanation of the picture was:

> I intended to convey to the public something of the splendid spirit that governs the medical profession. I intended to show that he was sparing no thought because the child was poor.

The medical man in the picture is believed to be the late Sir William MacCormac.

That medicine as a profession has appreciated the help that art has given is evident when we consider the matter. As collectors of their work and as friends of artists the medical profession stands pre-eminent. As collectors, it will suffice to refer to two leading physicians of the first half of the eighteenth century, Sir Hans Sloane and Richard Mead. Sloane's vast collection, which included pictures, manuscripts, books, medals, coins and objects of natural history, formed the nucleus of the British Museum. Mead's collection was sold after his death in 1754—his pictures for £3,417 11s., his prints and drawings for £1,920. There were about 150 paintings; his prints and drawings were so numerous that their sale was continued for fourteen successive evenings. There were engravings and etchings by Hogarth, Albert Durer, Rembrandt, Hollar and other famous artists; drawings by Raphael, Titian, Michael Angelo, Andrea del Sarto and others. The art collection of Baron Henri de Rothschild (1872 to 1934), doctor of medicine and a man of letters, was said to be the greatest in Europe.

If medical men have been unable in turn to immortalize the painter, at least they have done much to encourage the artist in his efforts and to prolong his mortal life. Sir Theodore Mayerne (1573 to 1655), physician to James I, Charles I and Charles II, and the most eminent practitioner of his day, was the friend of Rubens and Van Dyke and assisted them in the chemical composition of colours. Thomas Monro (1759 to 1833), doctor of medicine, artist and connoisseur, acted as host and patron to the young water-colour artists of his day, in particular to the youthful Turner, Thomas Girtin and the ill-fated John Robert Cozens, whom, from the time he lost his reason till his death, Dr. Monro attended with the greatest kindness and little or no reward. To the doctor's house at 8, Adelphi Terrace, London, also came Peter de Wint, himself the son of a physician, John Varley, Joshua Cristall and John Linnell; also William Henry Hunt, who received much practical assistance from the doctor, at whose country home he often stayed. All were welcomed by Dr. Monro and helped by him. The doctor's days were occupied with his medical work, but his evenings he devoted to assisting and teaching these young artists the art of water-colour painting, then in its infancy. He was himself an amateur artist, and his house contained many pictures and drawings by famous masters, which he allowed to be freely copied by his protégés. They came to his house in the evenings and worked under his instruction; and on holidays he invited them to his country home, so that they could make sketches from Nature. Monetary assistance he also gave, for like all unknown artists they were poor. By his kindness and help the doctor was a wonderful stimulus to the growth of the art of water colour. Monro's son followed the profession of an artist, and his grandson was both physician and artist. We remember, too, that it was another doctor, John Wolcot (1738 to 1819), who discovered the artist John Opie, Cornwall's premier painter. While practising at Truro he found the lad John Opie, whose promise and prospects he was the first to appreciate, and he took him to live at his home. Wolcot provided his friend with board and lodging, training and a studio. Together, at a later date, they went to London—Wolcot to attain fame as a satirist under the name of Peter Pindar, Opie to achieve success as a painter.

While most practising physicians and surgeons are unable to give to painting the long and assiduous devotion that it requires, medicine has produced not a few amateur artists of distinction. Sir Charles Bell and John Bell were equally skilful as artists and surgeons. Lennox Browne, the founder with Morell McKenzie of the Central London Ear, Nose and Throat Hospital, and its senior surgeon for many years, illustrated his own medical works; as did also Sir William Gowers—his favourite hobby was etching, and he exhibited at the Royal Academy. Richard Bright, physician at Guy's Hospital, Sir Henry Acland, Regius Professor of Medicine at Oxford, Priestly Smith, of Birmingham, and W. T. Holmes Spicer, of London, were accomplished artists, as were also Jean Martin Charcot and Paul Richer, of Paris. Sir Henry Thompson, Sir Prescott Hewett, Dr. F. G. D. Drewitt and Dr. Theo. B. Hyslop have painted pictures which were hung in the Royal Academy. Sir Henry Thompson (1820 to 1894) was a very distinguished surgeon. He has other claims to distinction as a novelist and host of the famous "octave" dinners. He studied art under Edward Elmore, R.A., and Sir Laurence Alma Tadema, R.A., and exhibited paintings at the Royal Academy frequently between 1865 and 1885. Two of his pictures were afterwards shown in the Paris Salon, and in 1891 he showed a landscape in this exhibition. Sir Prescott Hewett (1812 to 1891), Serjeant-Surgeon

[1] Rembrandt's celebrated painting, "The Lesson in Anatomy", portrays the artist's friend, Professor Tulp, who filled the chair of anatomy at the Amsterdam University, demonstrating on a "subject" to seven students. The picture, finished in 1632, is now in the Royal Gallery at The Hague.

to Queen Victoria and surgeon to Saint George's Hospital, was the first president of Saint George's Hospital Graphic Society, which was formed by the honorary medical staff in 1889 to encourage drawing and painting, photography and the arts of illustration. Every year they held an exhibition, strictly limited to the works of members. A distinguished member of the society was Dr. Frederic George Dawtrey Drewitt, etcher and artist in water colours; he exhibited in the Royal Academy, 1914-1915. Dr. Theo. B. Hyslop (1861 to 1933), senior physician to Bethlem Royal Hospital, painted a large number of pictures, three of which were hung at the Royal Academy.[1]

Sir Victor Horsley's father was an artist. His mother was Rosamund, sister of Sir Francis Seymour Haden, etcher and surgeon. Haden is one of the greatest medical figures in art. As an etcher he won great fame and by his work and writing did much to advance original etching. He was the founder, in 1880, of the Society of Painter Etchers, whose president he remained till his death. For the greater part of his life he carried on a large medical practice, first at Sloane Street, later in Mayfair, and was at one time vice-president of the Obstetric Society. But even when a student in Paris, he had spent much time in art schools, and as early as 1843-1844 printed his Italian plates. In 1847 he married the half-sister of Whistler,[2] and when Whistler came to London in 1855, Haden received a renewed stimulus to continue the art. From 1855 to 1887 he pursued etching, along with his professional work. The majority of his etchings was done during the years of his medical practice.

Professor Henry Tonks, F.R.C.S., Slade Professor of Fine Arts in the University of London since 1917, some years after graduation resigned surgery and the teaching of anatomy in order to give himself up entirely to painting and the teaching of drawing.

In other arts such as sculpture, architecture and the stage, the doctor has not figured prominently. Dr. Ribemont Dessaignes, a distinguished French obstetrician, had many of the productions of his chisel exhibited in the Paris Salon. George Redford, F.R.C.S. (1816 to 1895), published a "Manual of Ancient Sculpture" and was registrar of the Crystal Palace Exhibition of Sculpture in 1853-1854. Our contemporary, Tait Mackenzie, M.D. (McGill), 1892, Research Professor of Physical Education in the University of Pennsylvania since 1931, is one of the most eminent sculptors of today. His sculpture is to be found in Canada, the United States of America, England and Scotland. The Scottish American War Memorial in Princes Street Gardens, Edinburgh, is his work.

Architecture has attracted a few medical men. The colonnade of the Louvre at Paris, which is considered one of the most beautiful seventeenth-century structures, was the work of Claude Perrault (1613 to 1668), a distinguished French physician. English medicine can claim at least one architect of distinction, Thomas Rickman (1776 to 1841), who, after practising medicine for a few years, established himself as an architect in Liverpool and built churches and other edifices in all parts of England.

On the stage at least three doctors have figured prominently. James Sheridan Knowles (1784 to 1862) graduated M.D. at Aberdeen, but soon abandoned medicine for the theatre. He was successful as an actor in the British Isles and the United States of America, and also wrote many plays. Clyde Meynell (1867 to 1934) divided his life's work into successive stages of medical practice, acting on the stage and theatrical management. A few years ago the most accomplished actor in British comedy was Sir Charles Wyndham (1837 to 1919). A doctor's son, Wyndham graduated in medicine, gained his M.R.C.S. (London) in 1857, his L.S.A. in 1858, and in 1862 he went to America. There, during the Civil War, he volunteered and became a brigade surgeon in the Federal Army, retiring in 1864. Returning to London, he felt again the call of the stage, on which he had made his first appearance in 1862, prior to leaving for America. In 1876 he took control of the Criterion Theatre and produced a long succession of plays; in 1899 he and Lady Wyndham (as Mary Moore she had been his leading actress) opened the new theatre called "The Wyndham". He died in 1919.

Brief and incomplete as is this summary of medicine's relation to art, it will suffice to give some idea of the extent to which medical men, in Huxley's words, "have learned to take refuge in the great source of pleasure without alloy, the serene resting-place for worn human nature—the world of art".

[1] The Medical Art Society, formed in 1934, holds annual exhibitions in London, amongst its members being Sir Leonard Hill, Sir Harold Gillies and Sir Squire Sprigge.

[2] There is a famous story told of Whistler. He had a French poodle of which he was tremendously fond. The poodle began to suffer with an affection of the throat. Whistler called in Sir Morell Mackenzie, the great throat specialist, and when Mackenzie arrived at the painter's house and found that he was expected to treat a sick French poodle he was none too pleased, but he saw to the dog, prescribed for it, and drove away. The next day Mackenzie sent urgently for Whistler, and on his arrival said gravely: "How do you do, Mr. Whistler! I'm so glad you've come; I wanted to see you about having my front door painted."

Reports of Cases.

FRONTAL SINUS SUPPURATION WITH EXTRADURAL ABSCESS OF APPROXIMATELY TWELVE MONTHS' DURATION.

By CLIFFORD L. ROSEFIELD, M.B., B.S. (Melbourne), D.L.O. (London),

Clinical Assistant to the Ear, Nose and Throat Surgeon, The Alfred Hospital, Melbourne.

MR. D., aged seventy-five years, was admitted on September 3, 1935, to Dr. Bryan Foster's ear, nose and throat clinic at the Alfred Hospital.

Two years ago an abscess had formed above the left eye, and this had been opened at the Victorian Eye and Ear Hospital. The patient had refused further operation, saying that "he was too old for a big operation".

He complained of a discharge of pus into the left eye from the sinus which had remained open as a result of the previous incision.

On examination no sequestrum was seen or felt through the sinus; but operation was advised and again refused

by the patient. An X ray examination showed the left frontal sinus to be hazy, and no sequestrum was seen.

On October 13, 1936, the patient again attended the out-patient clinic, complaining that the discharge of pus from the sinus had become worse and caused discomfort, and he was afraid that it was affecting his left eye. He had no other complaint, only very slight headaches occasionally, when that was suggested to him. He had no nasal or post-nasal discharge.

On examination pus was pouring in large quantities from the sinus situated above the inner canthus; the amount could be increased by pressure, and the pus poured directly onto his left eye. Here there was an ectropion of the lower lid and considerable conjunctivitis.

There was neither tenderness over the left frontal sinus nor œdema, and nothing abnormal was detected in the nose, naso-pharynx or pharynx. The patient's temperature was 37·6° C. (99·8° F.) and the pulse rate was 108.

He was admitted to hospital and an operation was performed by Dr. Foster on October 16, 1936, under general anæsthesia.

An incision 1·5 centimetres above the left supraorbital margin was made across the forehead, the skin was retracted, the periosteum was divided, elevated and retracted, and the anterior table of the left frontal sinus was removed.

Thick purulent discharge was now seen forcibly pulsating through this opening with a pump-like action. The removal of the anterior table was continued across to the right frontal sinus, as the interfrontal septum had disappeared. When all the pus had been removed by suction it was seen that a large area of pulsating *dura mater* (about four square centimetres) had been exposed, the posterior table of the left frontal sinus having almost completely undergone necrosis.

The exposed *dura mater* was covered by red granulation tissue and was bound down to the edge of the bone by fibrous tissue. The left orbital plate was extensively necrosed and partially removed, and what mucous membrane of the cavity was left was removed to prevent refilling with secretion. It was found that the naso-frontal duct was already completely obliterated by fibrous tissue.

Several small sequestra were removed from the region of the fistula. The cavity was syringed with saline solution and flavine and was completely closed, except for one small gauze drain inserted at the outer extremity of the wound.

Healing occurred by first intention and the patient made an uneventful and rapid recovery. The patient was discharged from the hospital in two weeks. Considerable deformity of the forehead resulted from the operation; but nothing was done about it on account of the age of the patient.

A similar deformity in a young woman in her twenties following an obliterating frontal sinus operation was successfully treated in our clinic by filling the depression with a cartilage graft from the sixth and seventh costal cartilages. This was done about six months after the frontal sinus operation.

This case is interesting on account of the duration of the large extradural abscess—probably between one and two years—the almost complete absence of symptoms while such extensive suppuration and bone destruction could proceed, and the rapid recovery after operation.

Reviews.

A TEXT-BOOK OF MEDICINE.

THE third edition of the "Textbook of Medicine", edited by J. J. Conybeare, brings the book well up to date and maintains in every respect its previous standard.[1] This book, as in its previous editions, is the work of a number of authors, and it is interesting to reflect that a text-book of medicine which is primarily intended to give to students and practitioners the essentials of the subject in a short and simple form actually requires fifteen collaborators. The work has been very well done, and one surprising thing about this book is that while it is extremely easy to read it does not become discursive on the one hand, nor on the other hand does it omit anything of real importance. Alterations have been made in most of the sections of the book, some being completely rewritten, such as those on renal diseases and some of the metabolic disorders. The chapter on renal disease avoids unnecessary confusion by adopting a simple pathological classification, and contains considerable detail with regard to tests of renal function. It may be noted that the work of Nye on lead nephritis in Queensland is mentioned. The sections on respiratory and cardio-vascular disease have also been improved, though we cannot help pointing out again that the administration of oxygen through the nasal catheter is not the best technique of this particular form of therapy in pneumonia. Peripheral vascular disease now receives more attention, but we could wish that the words "arterio-sclerosis" and "atheroma" were used with more discrimination. The section on diabetes represents modern teaching on the subject, though perhaps a little more stress could be given to the value of giving the diabetic patient really adequate amounts of carbohydrate, as can so often be done with little or no increase in the insulin dosage. In general, no important criticism can be levelled against this book, for it would probably be difficult to find a better elementary book for students or for practitioners who do not want an extended disquisition on medical diseases. Its format is excellent, the type is well selected for comfortable reading, and the illustrations, particularly the reproductions of X ray plates, are clear and appropriate.

[1] "Textbook of Medicine", by various authors, edited by J. J. Conybeare, M.D., F.R.C.P.; Third Edition; 1936. Edinburgh: E. and S. Livingstone. Demy 8vo, pp. 1044, with illustrations. Price: 21s. net.

PLAGUE.

A MANUAL on plague, by Dr. Wu Lien-Teh, Dr. J. W. H. Chun, Dr. R. Pollitzer and Dr. C. Y. Wu, should be on the shelves of all public health workers.[1] In its pages there is a fund of general information on all aspects of the problem. There are also very copious references.

For the average medical man, even in places where plague is endemic, it would possibly be a less useful book. There is too little of that dogmatic summarization which is essential to the medical practitioner who generally has neither the time nor the experience to make practical judgements on debated points in such a special province. For him the book would be improved by the summarized opinions of the authors under their various sections. The parts dealing with Asian pneumonic and bubonic plague, and the practical suggestions regarding management of epidemics—guarding the staff against infection—and the rat-proofing methods are particularly interesting and well illustrated. The question of insect vectors and their mammalian hosts is fully considered. Some fifty pages of historical data and a section describing some remarkable cases (including the famous Indian plague murder case) add to the general interest and value of the book.

EMERGENCY SURGERY IN CHILDREN.

H. C. EDWARDS, in a short volume of 274 pages, deals adequately with surgical emergencies in childhood. The chapters on inflammatory conditions of the abdomen are excellently arranged and are obviously written from the author's own experience. They are a very valuable contribution to the literature on the subject. The book is not an exhaustive treatise, but is full of very useful practical information; it will be of great value to those experienced in the surgery of childhood, as well as to the general practitioner faced with the diagnosis and treatment of an emergency.

[1] "Plague: A Manual for Medical and Public Health Workers", by Wu Lien-Teh, M.A., M.D., J. W. H. Chun, M.B., B.C., R. Pollitzer, M.D., and C. Y. Wu, M.B., B.S.; 1936. Shanghai: The National Quarantine Service. Royal 8vo, pp. 580, with illustrations. Price: 15s. net.

[2] "Surgical Emergencies in Children", by Harold Clifford Edwards, M.S., F.R.C.S.; 1936. London: Baillière, Tindall and Cox. Demy 8vo, pp. 274, with illustrations. Price: 12s. 6d. net.

The Medical Journal of Australia

SATURDAY, FEBRUARY 20, 1937.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

THE MEETING OF THE FEDERAL COUNCIL.

THE meeting of the Federal Council of the British Medical Association in Australia, held recently in Melbourne and reported in this issue of the journal, marked a further stage in its development; for what was originally a purely consultative body under the title of Federal Committee is destined to become a unifying and controlling power among the Branches. For this reason it is incumbent on every member of the Association in Australia to follow the discussions of the Federal Council. At the last meeting every Branch except Western Australia was represented. The absence of Western Australian members can easily be understood, for the distance to be travelled is great; their non-attendance, however, is to be regretted from two points of view—the Western Australian Branch does not receive the stimulus generally associated with the gathering together of members of all the Branches, and the Federal Council is deprived of the wisdom and experience of councillors from the west.

The most important matter considered by the Federal Council had to do with the formation of a federal secretariat. The subcommittee had drawn up a comprehensive report that was most helpful to members of the Council. In the course of the report it was pointed out that impletion of the Federal Council's constitution was a matter of moment; that national insurance and other governmental activities were pending and that these were fraught with serious consequences to the members of the medical profession throughout Australia. The subcommittee expressed the opinion that an active, virile Federal Council, fully functioning, would be necessary to safeguard the interests of the profession; the Branches, with their limited authority, could not adequately undertake to perform the tasks that lay ahead. It also stated that to suggest that the Council should be content with present activities was to counsel despair. The Federal Council was not discharging the functions for which it had been constituted, and the reason was that it had never been in possession of sufficient revenue. In our report of the meeting are enumerated the various possibilities that were discussed after the presentation of the subcommittee's report. The proposal of the Queensland Branch seemed in the circumstances to be the most logical; that it was ultimately adopted as a basis for further action is due entirely to the generosity of the New South Wales Branch Council, which has shown itself capable of taking a statesmanlike view of the situation and of making considerable sacrifices for the common good. That the Federal Council regarded the matter as of the most serious import is shown by its willingness to discuss the widely divergent possibilities that were put before it. The question of the *per capita* payment by the Branches to the Federal Council for this year will be considered by the Federal Council at its next meeting. It would, in our opinion, be unwise to allow the Branches to withhold this payment. The future is fraught with great dangers that can be met only by foresight and organization. The members of the Branches will wish to have all that is possible done for their protection. What can be done will be done, but it will need a loosening and not a tightening of the purse strings.

The other matters dealt with at the meeting were mostly of the usual kind and call for no special comment. We would, however, join with the members of the Federal Council in their appreciation of the services of Dr. J. Adam Dick, so willingly given in many offices over many years, and of Dr. Bronte Smeaton, representative for so long of the South Australian Branch. The award of the gold medal of the British Medical Association in Australia to Sir Henry Newland is thoroughly deserved and peculiarly appropriate in this the year of his office as president of congress. The thought that prompted Dr. J. Newman Morris's proposal will be appreciated in all States of the Commonwealth.

Current Comment.

LOBECTOMY IN BRONCHIECTASIS.

W. H. C. ROMANIS AND T. H. SELLORS[1] are of opinion that only by the operation of lobectomy can the sufferings of the bronchiectatic patient be alleviated. The operation, they consider, should be restricted to those in whom the disease is strictly localized, and in whom lipiodol injections show that the bronchial dilatations are confined to one lobe. The importance of this strict localization has before now enabled surgeons successfully to remove the lower lobes of both lungs. The patient's suitability for operation also bears a direct relationship to the amount of sepsis and general toxicity present. The more the toxæmia, the greater the risk of operation. The present authors favour a single-stage operation, though in the hands of other surgeons the two-stage operation has been attended with good results. The most favourable subjects for lobectomy, they state, are young children in whom the disease has made so slight an advance that signs of toxicity and sepsis are few and bodily activity is but little curbed. In older patients who have become profoundly toxæmic, who have developed clubbing of the fingers, fœtor of the breath, an earthy complexion and all the signs of weakness and emaciation, the operation is attended with greater risk and its possible benefits are correspondingly lessened. It has been noted that the degree of the patient's toxicity bears a direct relationship to the difficulties of the operation. Amongst young children and other patients in whom the disease has been diagnosed at an early stage, the mortality rate may be expected to be low—no greater in fact than that following major abdominal operations. But since all too frequently many years are allowed to elapse before suitable notice is taken of the disabling marks of the disease, the lowest operative mortality that may be hoped for at the present time is about 17%. The mortality rate attending operation among patients presenting all the features of advanced bronchiectasis is estimated as being between 35% and 40%. It is important to observe in connexion with these serious cases that the general toxæmia is invariably much greater than is apparent on ordinary clinical examination.

The usual dangers inherent in the operation of lobectomy are shock, a spreading pneumonia, bronchial fistula, atelectasis and emphysema. Sometimes the operation is followed by massive pulmonary necrosis or spreading gangrene, which may later involve the chest wall. These terrible complications appear to be due to lack of resistance on the part of the patient and not to the virulence of the infection itself. It is possible in some degree to lessen these perils by postural drainage, bronchoscopy and suction before, and especially immediately before, operation.

It is evident that patients of the first class may be considered as what are known as good operative risks, but that patients in the second category, with abundant sputum and advanced physical signs, face an operation attended with grave risk to life. These considerations apart, children frequently undergo pulmonary operations with much less constitutional upset than is caused in adults. Their powers of compensation are relatively greater, and it is an important fact that the dead space remaining after lobectomy fills up with much greater rapidity in young than in older patients. A proceeding of immense value, in the matter of prognosis, is the taking of an X ray picture after the induction of a preliminary artificial pneumothorax. By this means the presence or absence of adhesions may be determined and a valuable estimate made as to the results likely to follow operation. Nevertheless, in all cases prognosis is immensely difficult, although the immediate results of operation may be encouraging; the subsequent expansion of the remaining lung may lead to emphysema and so to the development of further bronchiectasis. Not until a large series of patients who have undergone the operation has been observed for periods ranging up to ten years will it be possible to make accurate forecasts about the end results of pulmonary lobectomy.

The alternative methods of operative treatment, thoracoplasty and phrenicectomy, have immediately palliative results in bronchiectasis, but these cannot be said to be more than temporary. The great danger of another operation, that of pneumonectomy with the cautery, is the risk of creating a permanent bronchial fistula, as well as the chance of injury to the pericardium in cases involving the opening of bronchi close to the mediastinum.

To sum up, we may say that pulmonary lobectomy is still a very serious procedure, about the late results of which present experience does not enable us to pronounce judgement. Before operation is advised it is obviously important to settle the degree of disability and the exact state of the disease,

[1] *The Lancet*, December 19, 1936.

whether progressive or stationary. We must remember, however, that all too frequently the life of the patient is so miserable and he himself is such an offence to others that any operative procedure is justifiable. Probably the best method of achieving an advance in this branch of surgery, so far as Australian practice is concerned, would be the concentration of patients with bronchiectasis under the care of pulmonary surgeons in our larger hospitals. There is immense scope for work of this kind, and it offers a justifiable field for specialism of a peculiarly intricate kind.

THE CONTROL OF THE TOBACCO HABIT.

THE exact place of tobacco among the undesirable drugs the abuse of which may constitute a harmful addiction is perhaps a matter for argument. Also it is probably open to question how important is the use of tobacco as an ætiological factor in a number of diseases. Thus, although it is generally agreed that its use is undesirable in peptic ulcer, vaso-spastic disease, and certain diseases of the upper respiratory tract, it is hard to lay down in any individual case just how much blame can justly be apportioned to the tobacco. However this may be, doctors find it necessary to restrict or prohibit its use on numerous occasions. Perhaps the doctor, his own fingers stained with the frequently recurring cigarette, may even give this particular piece of advice with a sceptical or cynical air, knowing that it is highly probable that the addict will return to his habit in most cases, usually after a restless and unhappy period of deprivation. That it is more difficult to cut the daily allowance down appreciably than to abstain completely is a matter of common knowledge; this is remarked on by John L. Dorsey in a brief article in which he suggests a method by which tobacco withdrawal may be accomplished.[1]

Dorsey's method is to employ lobeline, the chief alkaloid of lobelia, which has been employed recently to some extent as a powerful respiratory stimulant in cases of collapse or poisoning. The action of lobeline resembles that of nicotine in many respects. Dorsey points out that it causes a brief stimulation of the motor centres in the spinal cord and medulla, followed by depression and even paralysis if the dose is sufficiently large. Its toxic symptoms are nausea, giddiness, faintness, vomiting and cold sweats, which correspond to those observed with nicotine. The lobeline is administered by mouth in capsules, the dose being 0·008 gramme (one-eighth of a grain), and in Dorsey's plan this is given after the mid-day meal of the first day, the patient having been allowed to smoke up till that hour. Further repeated dosage is given, according as the patient feels the urge to smoke, and it has not been found necessary to use more than eighteen doses in twenty-four hours; in many cases three or four will suffice. Apparently addiction to nicotine induces some tolerance to lobeline, a point which would make treatment easier, for the patient is allowed to judge when he needs a dose and to decide the number of days over which the treatment should persist. A lessened dose of lobeline is employed daily for about a week in most cases. Dorsey has found that the patients usually complain of some nausea and malaise and of a metallic taste in the mouth, but no other uncomfortable symptoms. Over-dosage is hardly possible on account of the occurrence of nausea. The results recorded appear to be good, and, according to this author, lobeline has helped patients who are tobacco addicts to abandon the habit without trouble.

The improvement described in numbers of patients after they have ceased smoking will be admitted by most observers, that is, in patients who seem definitely to have been harmed by abuse of the tobacco habit. What is more doubtful is whether the reformation will be permanent. Dorsey says "it is a question for the patient to decide whether he thinks it worth while to stay stopped". The patient's decision in this matter is not always that of wisdom, as we all know; in fact it is doubtful if real addiction to tobacco is not partly due to a cause common to all addictions, whether harmless or harmful—an idiosyncrasy of temperament. However, those who wish to assure the discontinuance of smoking in their patients might like to try this withdrawal method, which seems logical and safe.

[1] *Annals of Internal Medicine*, November, 1936.

RAW VEGETABLE DIET IN CHRONIC RHEUMATIC CONDITIONS.

DR. DOROTHY C. HARE, in her president's address to the Section of Therapeutics and Pharmacology of the Royal Society of Medicine, reported the result of a therapeutic trial of a raw vegetable diet in chronic rheumatic conditions.[1] She points out that diet treatment is not generally recognized by the medical profession in Great Britain as one of the weapons with which to attack rheumatic conditions. Twelve patients were given a raw vegetable diet for periods of two weeks, followed by a modified diet for further periods. No other method of treatment was used during the period of observation. Ten patients obtained relief from pain; those who had muscular pain and stiffness with simple effusions into the joints received most benefit. Though other factors were not excluded, Hare thinks that the immediate results were due to the low sodium content of the diet. She gives details of her treatment; but she does not wish it to appear that she believes this type of diet to be suitable in all cases, or that it should be used to the exclusion of other methods. Since medical practitioners do not devote nearly enough attention to diet, they should, if possible, read Hare's address. It will perhaps stimulate them to undertake similar therapeutic trials.

[1] *Proceedings of the Royal Society of Medicine*, November, 1936.

Abstracts from Current Medical Literature.

PHYSIOLOGY.

The Influence of Copper on the Rate of Disintegration of Mammalian Erythrocytes.

THE length of the life of red blood cells in the circulating blood is not definitely known. From the amount of bile pigments excreted, it has been calculated to be about three or four weeks. When the corpuscles reach a certain stage of development their cell membranes become weakened. This is followed by disintegration of the cell. It is known that there is a decrease in resistance to disintegration of the corpuscles in certain diseases. The resistance of the cells to hæmolysis is thought by some to depend upon the age of the corpuscles, the membrane becoming progressively weaker with age. During recovery from hæmorrhage the resistance of the corpuscles is greatly increased. G. C. Wickwire, W. E. Burge and Ruth Krouse (*American Journal of Physiology*, August, 1936) have investigated the relative importance of copper on the rate of disintegration of erythrocytes of animals during recovery from nutritional anæmia. Thirty albino rats, six to eight weeks old, were used in these experiments. Twenty of the animals had been made anæmic by placing them on a milk diet. The rate of disintegration of erythrocytes of these nutritionally anæmic rats was found to be greater than that of normal animals. Erythrocytes of animals given an adequate copper diet showed increased resistance to disintegration, and these experiments would seem to indicate that a beneficial effect of copper could be attributed to changes in the corpuscles.

The Nature of Bacteriophage and its Mode of Action.

A. P. KRUEGER (*Physiological Reviews*, January, 1936) considers that future progress in the study of bacteriophage demands the utilization of the methods of general physiology. It is some twenty years since the discovery of bacteriophage, yet it must be admitted that three major questions concerning it remain unanswered. These are: "What is bacteriophage?" "How does it act upon bacteria?" "What is the biological significance of its ubiquity?" In making this criticism Krueger does not intend to detract from the value of the work already done, which has served to define the field, establish general relationships and solve many of the important primary problems. The biologist's inability to furnish an exact definition of what bacteriophage is signalizes the peculiar difficulties which attend the investigation of complex biologically active materials, whether these are hormone, enzymes, antibodies or viruses. Future progress demands the application of the powerful technical and theoretical approaches of biological chemistry. This review of the literature is made at a transition period, but the importance of the physiological part of the work is already evident. It is quite likely that bacteriophage either is a protein or, more certainly perhaps, that its activity is in some manner dependent upon a protein structure in bacteriophage. It possesses many of the properties of an enzyme. Despite the many difficulties which are always encountered in purifying substances of high biological activity when only minute amounts are present in complex solutions, the current trend points to the successful purification of bacteriophage within a relatively short time.

Transport of Carbon Dioxide in Blood.

J. K. W. FERGUSON (*Journal of Physiology*, October, 1936) has described the results of further work on the carbamino compounds of carbon dioxide with hæmoglobin. The earlier methods applied to ox hæmoglobin have been modified to permit an extension of the study to human blood. The same general properties are exhibited by the carbon dioxide and hæmoglobin compounds of both ox and human hæmoglobins. It has been shown that oxygenation greatly reduces the affinity of hæmoglobin for carbon dioxide. Of the difference in total carbon dioxide capacity of reduced and oxygenated hæmoglobin, 70% to 75% can be accounted for by the greater carbhæmoglobin ($HbCO_2$) content of the reduced hæmoglobin solution. Calculations indicate that in the resting subject about 30% of the total carbon dioxide transported is carried in the form of carbhæmoglobin, and about 75% of the carbon dioxide transported in the red cells is similarly carried. It has not yet proved possible to estimate the importance of carbhæmoglobin in the transport of carbon dioxide during exercise, because of the complication introduced by the accumulation of lactic acid in the blood under these conditions.

Distension a Stimulus for Uterine Growth in Untreated Ovariectomized Rabbits.

SAMUEL R. M. REYNOLDS AND SANDFORD KAMINESTER (*American Journal of Physiology*, August, 1936) report that uterine growth may be induced by means of chronic intrauterine distension in rabbits that have had their ovaries removed. That distension may be an adequate stimulus for uterine growth is suggested by the fact that the tissues of gravid uterine cornua in unilateral pregnancy in rabbits and cats are larger than are the tissues of the non-gravid horn which is subjected to the same hormonal conditions. In the present experiments a dissociation of the effect of distension from the simultaneous action of the ovarian hormones was achieved by the insertion of paraffin pellets of known size into the uteri of rabbits that had been deprived of their ovaries. The pellets were left *in situ* for two weeks. At the end of this time three segments of uteri were removed from each animal. These segments were: (i) the site of chronic (two weeks') distension, (ii) a non-distended portion of the uterus, and (iii) a site into which a pellet had been inserted just prior to removal of the tissue (acute distension). The distended tissues were fixed with the pellets *in situ*. In the chronically distended portions there was found an equally distributed increase of endometrium and myometrium. The endometrium increased by active proliferation of the epithelium as well as by hypertrophy of its cells and an increase in the amount of stromal connective tissue. The myometrium underwent hypertrophy and possibly hyperplasia. The increased amount of cytoplasmic to nuclear material in these cells in chronically distended uteri was striking. The changes observed did not appear to be the result of inflammation or irritation. A maximal growth stimulus was found when the distending influence was approximately equal to the size of the undistended uterus.

Function of the Large Intestine.

C. S. WELCH, E. G. WAKEFIELD AND M. ADAMS (*Archives of Internal Medicine*, December, 1936) have studied the function of the large intestine of a subject with an ileostomy stoma and an isolated colon. The patient, a young woman, had been subjected to a single barrel permanent ileostomy, which had left an isolated large intestine. At operation the ileum, which had been severed close to the ileo-caecal junction, was brought out through the abdominal wall. Hereditary polyposis of the colon was the indication for the operation. It was possible to determine the composition of the intestinal material normally delivered to the large intestine. At the same time the substances accumulated in the isolated colon during known metabolic periods were determined. It was found that the organic constituents of the food were digested and absorbed before they reached the colon. The authors state that the ileum delivers to the colon solid material and a variable amount of fluid which seems to be near osmotic equilibrium with the blood. This ileal material contains a large amount of sodium and chloride when compared with normal fæces. A function of the colon is the absorption of electrolyte and water. It appears to the authors that the human colon has no specific function in the excretion of minerals. No substantial amounts of calcium or iron were recovered from the isolated colon. The suggestion is made that probably variable amounts of cellular *débris* and bacteria may be added to the intestinal contents in the colon, the total mass that ultimately becomes fæces being thus augmented. This, in the authors' opinion, is not a specific function.

BIOLOGICAL CHEMISTRY.

Structure and Synthesis of Vitamin B_1.

R. R. WILLIAMS (*Journal of the American Chemical Society*, June, 1936) proposed for vitamin B_1 a new formula in which 2.5.dimethyl-6-aminopyrimidine was linked through the 5-methyl group with the N atom of 4.methyl 5-β-hydroxyethylthiazole.

In a later publication (*ibidem*, August, 1936) R. R. Williams has described the synthesis of this compound. The synthetic substance was found to be physiologically and chemically identical with the natural vitamin B_1.

Zymolysis of Urea.

W. R. FEARON (*Biochemical Journal*, September, 1936) has produced additional evidence to show that the enzymic hydrolysis of urea proceeds by direct deamination with the formation of carbamic acid. The carbamic acid is not produced by hydrolysis of a precursor. Cyanic acid is produced by dehydration of ammonium carbamate and can appear in the later stages of the reaction only when the carbamate content has reached a sufficiently high level. The author gives a scheme of chemical formulæ that he has proposed to represent the changes occurring in the urea/urease system.

Pernicious Anæmia.

THE conclusion of Greenspon that it was unnecessary to postulate the "extrinsic factor" of Castle as an essential principle in the ætiology of pernicious anæmia has not been sustained by the results of further experiments of W. B. Castle and T. H. Ham (*The Journal of the American Medical Association*, October 31, 1936). The authors have shown that normal human gastric juice does not contain an antipernicious anæmia principle effective, on oral administration, without contact with food (extrinsic) factor. Hog stomach mucosa contains both extrinsic factor (thermostable) and intrinsic factor (thermolabile), which are responsible, presumably, for the activity of such mucosa and of whole desiccated hog's stomach. Beef muscle (containing extrinsic factor) and normal gastric juice (containing intrinsic factor) administered to a patient in such a manner as to prevent contact, are not effective in the treatment of pernicious anæmia. Incubation of normal gastric juice for two hours at 37·5° C. in the presence of native pepsin and hydrochloric acid, inactivated a portion of its intrinsic factor.

Microtitration Method for the Estimation of Blood Sugar.

B. F. MILLER AND D. D. VAN SLYKE (*Journal of Biological Chemistry*, July, 1936) have described in detail a method for the estimation of glucose in blood by direct microtitration. The proteins in 0·1 millilitre of blood are precipitated by cadmium hydroxide; the excess cadmium is removed by precipitation with barium carbonate; the filtrate is heated with a large excess of ferricyanide and the ferrocyanide produced by the oxidation of glucose is then titrated with ceric sulphate solution, setopaline *c* being used as an indicator. The values of glucose obtained by this method agree closely with the fermentable sugar except in blood samples which show a pronounced nitrogen retention (urea nitrogen over 40 milligrammes *per centum*).

Pancreatic Function.

A GROUP of three papers has been published by H. P. Harms, J. van Prohaska and L. R. Dragstedt (*American Journal of Physiology*, September, 1936) on the pancreatic function. The main conclusions of these workers may be briefly summarized as follows. Complete withdrawal of pancreatic juice by total external pancreatic fistulæ in dogs did not cause hyperglycæmia or glycosuria. Oral administration of fresh pancreatic juice did not lessen the severity of diabetes in completely depancreatized dogs. The fatty degeneration and infiltration of the livers of the depancreatized dogs were not due to the absence of pancreatic juice from the intestines, but to the absence of some specific substance present in fresh pancreas. This substance was obtained in alcoholic extracts of beef pancreas, and on oral administration permitted survival and prevented and relieved the fatty degeneration and infiltration of the depancreatized dogs. This substance was believed to be a new hormone concerned in some way with the normal transportation and utilization of fat. The name "lipocaic" has been suggested for the specific substance.

Lysine and Growth.

IN experiments with rats, C. P. BERG (*Journal of Nutrition*, December, 1936) has demonstrated that d(−)lysine is unable to promote growth when fed as a supplement in a lysine-deficient diet. When the naturally occurring l(+)lysine was given as a supplement, the animals grew normally.

Artificial Thyreoid Protein.

W. T. SALTER AND J. LERMAN (*Endocrinology*, November, 1936) have shown that approximately two-thirds of the iodine in thyreoglobulin extracted from human thyreoid glands surgically excised in a non-endemic goitre district is not combined as thyroxin. This non-thyroxin iodine is present in an "inactive" diiodotyrosine fraction, which is potentially a source of active hormone. These workers succeeded in building up an artificial protein from peptone containing the diiodotyrosine, by enzyme (pepsin) action so directed as to reverse the usual digestive process. The artificial protein so obtained resembles the natural thyreoglobulin in its chemical properties and clinical effects. It is suggested that the diiodotyrosine peptone fraction represents a chemical precursor of thyreoglobulin and is readily transformed into the active hormone by enzymes in the body.

Availability of Copper.

M. O. SCHULTZE, C. A. ELVEHJEM AND E. B. HART (*Journal of Biological Chemistry*, September, 1936) have shown that the copper of wheat germ, alfalfa, brewer's yeast, pork heart, pork liver, cysteine, cuprous mercaptide, copper aspartate, copper citrate, copper nucleinate and copper pyrophosphate is readily utilized by severely anæmic rats to supplement iron in hæmoglobin formation. They consider that the availability of "copper in naturally occurring food materials and in compounds that might be used for copper therapy, is not a problem of practical importance as far as the dietary supply of copper is concerned".

Leucines and Growth.

M. WOMACK AND W. C. ROSE (*Journal of Biological Chemistry*, November, 1936), by the use of diets devoid of proteins, but containing mixtures of highly purified amino-acids supplemented with a concentrate of threonine, have obtained convincing proof of the indispensable nature of leucine and isoleucine. The omission of either from the food leads to a profound nutritive failure. Apparently norleucine is not essential for growth. Final conclusions regarding this amino-acid cannot be given until further experiments have been carried out.

Vitamin C Studies in the Rat and Guinea-Pig.

J. L. SVIRBELY (*The Journal of Biological Chemistry*, December, 1936), as the result of a series of experimental studies, concludes that administration of metallic salts, some of which poison the intestinal epithelium, does not prevent the synthesis of vitamin *C* in the rat. The body has a protective mechanism which prevents the catalytic oxidation of vitamin *C* with copper sulphate. Halogenated compounds, such as bromobenzene or iodoacetic acid, interfere with the synthesis of vitamin *C* in the rat; other organic substances did not show this property. When guinea-pigs were given a diet rich in sodium salts (a mixture of sodium chloride and sodium citrate added to the usual basal diet) they succumbed in the usual time interval and with the same severity of scorbutic symptoms as on the Sherman-Smith basal diet. The author states that vitamin *C* is the limiting factor in preventing scurvy, and, in those animals susceptible to this deficiency disease, is necessary for the utilization of the cortical hormone or the salt mechanism apparently controlled by cortin.

Special Article.

(Contributed by request.)

IMMUNIZATION AGAINST DIPHTHERIA.

THE practice of artificial immunization against diphtheria toxins is now established. When carried out in large or small communities or groups of children, it is mainly the concern of the public health officer; when in individuals, of the family doctor. If an individual child is to be immunized, it is possible to lay down certain definite rules, and to say flatly that any pronounced departure from those rules is wrong; the matter is not quite so clear when we are dealing with large communities. Routine methods applied to a population will produce certain results in that population as a whole, depending on a number of preexisting factors, but no particular result can be awaited with certainty in any individual in that population. Further, immunity is a loose term embracing an infinite number of grades of resistance, with at one end complete susceptibility and at the other complete indifference to a bacterium or poison. Furthermore, immunity is relative, in that it may at any time fail or succeed under different sets of circumstances; and, lastly, even when attained, it does not remain indefinitely at the same level.

Ever since the introduction of artificial immunization into this country, I have had the advantage of discussions with those engaged in the work, and of being asked to reply to a great variety of questions propounded by them. I have never actually performed an artificial immunization in my life, and evidently they have acted on the supposition that "the onlooker sees most of the game". During the past few years the worries present in the minds of most of them seem to crystallize round the following questions.

1. Is the Schick test level of immunity a completely satisfactory standard in all circumstances?
2. Is the risk of unpleasant reactions sufficient to determine for us the choice of a prophylactic and the method of its administration?
3. To what extent is it safe and satisfactory to shorten and ease the period of inoculation?

It is neither fair nor wise to answer these questions dogmatically, and for me to do so would convince nobody. It is necessary to consider the whole matter in some detail, applying the processes of reasoning, and applying to our conclusions the facts gained by observation.

We all know that if we inject a small amount of diphtheria toxin into a child or a horse, antitoxin will soon be detectable in the blood. If the subject has never before received toxin, the antitoxin will not appear for some weeks; it reaches a maximum slowly, and then declines. But if a second injection of the same amount of toxin be made, either now or at any future time, the response is much quicker and much greater. Immunity consists in this increased ability to respond, and is produced in no other way than by the introduction of antigen into the body. There is no such thing as "natural" immunity, if we except the temporary condition in an infant whose mother is immune.

Immunity is an acquired quality, and its basis is subinfection. Any conditions which increase the number of small infections increase the chances and the quality of the immunity, both of the whole population and of the individual. If an epidemic strikes a community, the survivors, including those who have escaped the disease, are more resistant than they were before the epidemic. Survival or death is determined partly by luck, the doses of toxin received being unequal in amount or toxicity, and partly by the preexisting degree of actual or potential immunity.

The antitoxin present in the blood is not the essential element of immunity; even though it all disappears, the increased power of response remains; this is a potential immunity which lasts indefinitely. But children living in cities (or for that matter cab horses living in cities) come into repeated contact with diphtheria and absorb repeated doses of diphtheria toxin, and such children have from time to time a variable amount of antitoxin circulating in the blood. In the child population of a crowded city we may find a Schick-immune rate as high as 80%.

In any individual a rough indication of the amount of antitoxin circulating in the blood can be obtained by injecting an arbitrarily fixed amount of toxin—the Schick test dose. There is no absolute line of demarcation between Schick-reactors and non-reactors; persons whose blood shows one one-hundredth of a unit of antitoxin per cubic centimetre will probably fail to react; those who have less than one one-thousandth of a unit will react. A non-reactor may have, at the time of the test, as little as one five-hundredth of a unit of antitoxin.

It used to be thought that the Schick level was about one-thirtieth of a unit per cubic centimetre, but this was because it was usual for the antitoxin content to be estimated some days after the test, and the fact was overlooked that the toxin injected in the performance of the test induced in immunes a rapid production of antitoxin, even though the amount of toxin was so very small.

While there is individual variation in the Schick test level, nevertheless, as we shall see, the test gives us satisfactory information in the vast majority of cases.

First, let us take those children who are Schick-reactors.

1. At the furthest extreme we find those who have never had a stimulus, and who have absolutely no immunity, actual or potential, and no antitoxin in the blood.

2. Next we have those who have had stimuli, but not recently, and who have no antitoxin in the blood at the time. They are potentially immune, but not actually so.

3. Next come those who have had stimuli more recently, and have a small amount of antitoxin in the blood. These have both potential and actual immunity, but nevertheless below the Schick test level, and they react to the test.

It is clear that in considering such problems as susceptibility and active immunization, each grade and all intermediate grades must be taken on their merits. Given equal conditions of infection, it is easier for a child in Grade 1 to develop an attack of diphtheria than a child in Grade 2, and so on. It is also clear that active immunization will as a rule be easier and more rapid in children of Grade 3 than of Grade 1. Plenty of Schick-positive children are so immune that the minute amount of toxin injected in repeating a test will convert them into non-reactors.

Then also it must be repeated that immunity does not depend on antitoxin circulating in the blood. Many children in Group 2, with high potential immunity, but no antitoxin, will respond to a stimulus as rapidly and to as great a degree as those in Group 3.

It is therefore quite wrong to conclude that because a child is a Schick-reactor, he is highly susceptible to diphtheria.

Some few persons appear never to become Schick-immune in spite of repeated stimuli, either natural or artificial. If a group of susceptible persons is given similar stimuli, at the same intervals, some will reach the Schick-immune level more quickly than others, and some few will not reach it at all. There are thus different grades of "immunizability". Communities in which there has been little infection and in which little latent immunity exists, are notoriously harder to immunize artificially than those in which diphtheria has been epidemic or long prevalent.

Now let us consider the Schick non-reactors. As with the Schick-susceptibles, there are all grades, rising from the border-line cases to those with almost complete and perfect immunity. But every child who is, or has ever been, a non-reactor has had stimuli, and possesses in some degree either actual or potential immunity or both. That is all that can be said.

Just as it is wrong to conclude that because a child is a Schick-reactor he is highly susceptible to diphtheria, it is equally wrong to assume that because a child has been, or even is at the time, a non-reactor, he is completely safe from an attack of diphtheria under all conditions. His power of escaping attack depends on four factors.

1. His actual immunity at the time, that is, the amount of circulating antitoxin in the blood.

2. His potential immunity. This depends to some extent on the number, spacing and duration of the stimuli he has had.

3. Dosage of infecting organisms, which again may be influenced by bad housing conditions, overcrowding, and unhealthy conditions of the nose and throat.

4. The toxicity and virulence of the infecting organism.

At the 1923 session of the Australasian Medical Congress I made myself unpopular by stating this position, and protesting against the over-complacent claims of propagandists, which I thought would, if persisted in, do a great deal to discredit immunization. It was, therefore, permissible to feel a certain grim satisfaction in observing the rapid flight from an untenable position which occurred two years ago. This followed, and was largely due to, the occurrence of greatly increased virulence and toxicity associated with *gravis* and *intermedius* strains of *Corynebacterium diphtheriæ* in the north of England, Germany, and elsewhere.

It was impossible to read patiently such sales-talk as the following, which appeared in a leading article in a foremost medical journal so late as June 16, 1934:

> . . . . and "notifiable" [*sic*] diphtheria will occur even in immune individuals so long as every sore throat from which a few morphological Klebs-Loeffler bacilli have been cultured, continues to be erroneously regarded as necessarily diphtheritic. . . . gravis bacilli are more invasive than mitis, since they may cause, in Schick-negative people, a trivial illness called "diphtheria" [*sic*], but active immunization is a sound method of protection against recognizable clinical infection with gravis bacilli.

This is precisely the sort of airy talk against which some of us had been protesting for years.

Only a few months after the appearance of this article, reports of cases of severe diphtheria in Schick-immunes and immunized children began to come in. Underwood reported sixteen cases from Leeds, one of which at least was very severe. All of the patients had been immunized and were Schick-negative, and all of the eight tested at the time of onset of illness failed to react. The infecting organism was of the *gravis* strain in all cases. Parish and Wright reported cases of infection from London, and then Robinson and Marshall from Manchester. Robinson and Marshall reported thirteen cases in Schick-immunes, two being fatal; they reported eleven others (one fatal) in immunized subjects during 1934, in whom the confirmatory Schick test had not been performed. Of the 24 infections, 19 were of *gravis* and five of *intermedius* type. Seven were clinically mild, nine moderately severe, and eight severe. The three deaths were due to diphtheria toxæmia.

Now there is no need to take this too seriously. This is not the first or second time that highly virulent and toxigenic strains have become unusually prevalent in various countries or areas, and we may be perfectly sure that deaths in Schick-immunes have been occurring off and on in one area or another for generations past. Again it need not affect our attitude towards immunization. All that is necessary is that we recognize the limitations of the Schick-immune state, whether acquired naturally or artificially. Possibly we may have to raise our Schick test level; we at least must readjust our ideas on it; possibly, in order to gain protection against these malignant strains, we shall have to make artificial immunization a longer and more toilsome thing than it is at present.

The Schick-immune state is no absolute guarantee against a mild, or even a severe attack of diphtheria; but every Schick-immune child has a very considerable immunity, and no Schick-immune community can suffer greatly from diphtheria.

Neither is the Schick-immune state a fixed or permanent one. Its duration depends, most of all, on the repetition of stimuli. Failing such stimuli, relapse is to be expected sooner or later. But the potential immunity remains, and no child and no community that have once been Schick-immune are likely to suffer greatly from diphtheria.

And, now, to emphasize essential points in the preceding discussion, I shall enunciate them dogmatically and without the slight qualifications which might be necessary to make them scientifically exact.

1. The Schick level of immunity is an arbitrarily chosen one, indefinite quantitatively, but indicating the presence of a fair degree of actual immunity.

2. This state has been brought about by previous repeated or prolonged stimuli.

3. There are all grades of immunity and susceptibility both above and below the Schick level.

4. For the maintenance of the Schick level further stimuli are necessary from time to time.

5. Relapse from a Schick-immune to a Schick-susceptible state may and does occur. The importance of this should not be exaggerated; such a person is in a far better position than one who has never been Schick-immune.

6. Diphtheria, either mild or severe, may occur in persons who have been, or even are, Schick-immune. Reasons for this may be: (*a*) a border-line degree of immunity, (*b*) large dosage of infection and amount of toxin absorbed, (*c*) unhealthy local conditions of the body tissues, (*d*) high virulence or toxicity of the strain of infecting bacterium.

Nature's method of immunization, therefore, is by repeated small stimuli, which may safely increase in amount as immunity grows. By the same methods, she continues to maintain immunity throughout life. Too much luck, however, enters into the matter. If the first stimulus is too large in quantity, or too potent in toxicity, disease and death occur. Nature's method is a cruel one; she is prodigal and wasteful of life, and in her process of immunization tens of thousands of children fall by the wayside and die each year.

In all processes of artificial immunization we imitate Nature's method of repeated stimuli, while avoiding a fatal or dangerous dose. It has been shown that the intensity or severity of the stimulus is less important than its duration, and a knowledge of this was the basis of the original method of immunization by toxin-antitoxin mixture. Dissociation of the mixture occurred over a period, and a succession of minute doses of toxin were liberated. "Mixtures" are now going out of favour (except toxoid-antitoxin floccules), and the aim nowadays is to get as pure and as potent a toxoid as possible, and then to combine it with a foreign substance, such as alum or tapioca, which precipitates the toxoid. The latter is then slowly released, and antigenic stimulation is kept up for a long time.

Materials and methods are steadily being improved, and the desiderata are quite obvious. We want:

(*a*) That the method shall be safe, and that unpleasant general and local reactions shall be reduced to a minimum.

(*b*) That the immunity shall be well above Schick test level.

(*c*) That it shall be rapidly attained.

(*d*) That it shall be produced with a minimum of injections, which mean time, trouble and expense to the patient.

(*e*) That it shall be lasting.

The Avoidance and Reduction of Reactions.

The basis of the prophylactic material is diphtheria toxin. Diphtheria bacilli are grown in broth, and at least three substances are present, two of which have to be eliminated before it is possible to get a completely safe and efficient product:

1. Diphtheria toxin. This is nowadays rendered harmless, but with its antigenic qualities unimpaired, by turning it into toxoid (formol-toxoid, anatoxin).

2. Non-specific compounds from the broth and from the bacilli. These are being got rid of more and more by special methods of purification.

3. A third substance, intimately connected with the toxin, and not destroyed by heating. It is probable that this substance causes not only the pseudo-reaction and the Moloney reaction, but also the unpleasant local and general reactions following late after the injection of the full doses.

Toxoid is quite safe and non-toxic. An enormous amount can be injected without harm. But until the foreign and pseudo-constituents can be eliminated, local reactions, swellings and sickness will occur in susceptible persons. By absorption, precipitation and dialysis these substances are being steadily reduced, and when the chemist can make pure toxin, reactions will be a thing of the past.

The Moloney-Fraser test gives an accurate indication of those persons liable to show symptoms if immunization is proceeded with in the ordinary way. Three lines of action are open to us in dealing with persons shown by this test to be susceptible:

1. Some advise that active immunization be not gone on with, as more than half of them, even though Schick-reactors, have some immunity. I agree with this advice in cases of adults and adolescents; they have a greater liability to severe reactions and a smaller risk of severe diphtheria. But I do not think it should be applied to little children, if Schick-susceptible.

2. They may be immunized with toxoid-antitoxin floccules (T.A.F.). This is slower in action than "F.T.", but rarely gives rise to reactions. It is the easiest and safest of all immunizing agents, but is expensive, and not readily procurable in Australia.

3. They may be immunized with formol-toxoid (F.T.), a start being made with a very small dose, and the amount being gradually increased till four or five doses have been given.

The reactions specially associated with alum-precipitated toxoid (A.P.T.) will be referred to later.

The Attainment of Adequate Immunity.

Obviously the number and size of stimuli needed to produce the Schick level of immunity in any individual will depend on his initial state. The Schick test will tell us if he has reached that level; but if he has not, it will not tell us how far he is from it. Some Schick reactors will require only one injection of a given prophylactic, others will need two, three, four or more. The common and rational proceeding is to take a combination of a prophylactic, a dosage, and a spacing that has been found efficient in an average non-immune population. For such a population, the number of injections may be stated as three of "F.T.", or two of "A.P.T.", the dosage as 1·0 cubic centimetre of "F.T.", or 0·5 or 1·0 cubic centimetre of "A.P.T.", and the spacing as a fortnight. As will be seen, it may be possible to relax, or advisable to tighten up, these requirements.

What is necessary is that later it shall be ascertained whether the Schick-negative state has been achieved. The necessity for this is clear, and no excuse for its omission can be accepted. Inoculation does not necessarily mean immunization. The time when it is reasonable to make this confirmatory test will vary with the prophylactic used, and with other factors which cannot be accurately assessed, such as the state of the population or individual before treatment was begun. With certain very potent toxoids it has been found that 84% to 96% of children have been made Schick-immune within four weeks. For practical purposes it is reasonable to wait from eight to twelve weeks after "F.T." injection, and from four to six weeks after "A.P.T."

By some it is suggested (and practised) that young children found Schick-immune should at the time of the reading of the test be given one injection of prophylactic. With this I entirely agree. It means no additional visit, little or no expense, and no extra inconvenience, and every additional stimulus helps towards the establishment of a safe immunity. Many non-reactors are only just above the Schick test level.

Rapid Attainment of Immunity.

More and more potent toxoids are being prepared, and with this development the average period of induction of immunity is becoming shorter. "A.P.T." as a rule brings immunity more rapidly than "F.T." But the period of induction depends so much on the initial state of the group or community being treated, that it is difficult to judge the merits of the widely differing results in the large number of groups reported on. If one worker immunizes 95% of a group of 500 children in six weeks, and another, using the same prophylactic in the same number of doses and with similar spacing, records only 85% in eight weeks, then it is clear that the very fine performance put up by the former group must stand to the credit of the children rather than of the prophylactic.

To put it into round figures, and taking a child population of average susceptibility, a percentage of 90% to 95% rendered immune in eight weeks, or 95% to 98% in twelve weeks, by three doses of "F.T." (or in a rather shorter period by a very potent "F.T."), or 85% to 90% in four weeks and 90% to 95% in eight weeks by one or two doses of "A.P.T.", can be regarded as a good and satisfactory result.

Reduction of the Number of Injections.

In the reduction of the number of injections a difficulty appears. One great thing to be desired is that there shall be as few injections as possible, the ideal being one. To that end the biological chemist has been making antigens of greater and greater potency. But with these more potent prophylactics there has been a greater tendency to local and general reactions; to offset this, he is making the antigens purer and purer. In both respects he has gone far during the past few years, and good results have been obtained with two injections of some modern high potency toxoids, properly spaced. Going further, he now prepares these toxoids, as pure as possible, mixes them with some substance, such as alum, so that the whole of the toxoid may be used and not largely wasted as was previously the case, and so that by its incorporation into a relatively insoluble precipitate, it can be released gradually over a long period, providing a continuous stimulus, or an infinitesimal number of minute stimuli.

The reactions following the use of "A.P.T." are of two kinds: (*a*) Those due to the "F.T.", and especially the potent "F.T." used nowadays. The risk of such reactions puts the "one shot" "A.P.T." method out of the question in Moloney positive persons; it should not be used. (*b*) The "lump" or induration caused by the retention of the alum in the tissues. This is a necessary evil; the lump disappears in time. Abscesses do not occur nowadays, since better methods of purification have been used. It is to be hoped that some other substance, not so irritating as alum, and more readily absorbable, will be found, which will, nevertheless, hold the antigen and release it slowly over a sufficient period.

At present the best combination appears to be a fairly low alum content with a fairly high potency toxoid, undiluted.

Whether or not alum ultimately be replaced by some other retarding agent, there is no doubt of the soundness of the principle and the increased efficiency of the prophylactic. Antigen is produced more rapidly and in larger quantities. It is found that one injection of 1·0 cubic centimetre of "A.P.T." can in some individuals or groups produce Schick-immunity in the same percentage, and quite as quickly, as is produced by two injections of "F.T." Many children can be immunized by two injections of "F.T." and many can by one injection of "A.P.T." But it is certain that many children should have not two injections of "F.T.", but three, or even more, and it is equally certain that many children should have not one injection of "A.P.T.", but two at least.

There is no need to labour the point, the principle has been reiterated over and over again. The rate at which immunity develops, and the degree which is attained, will depend quite as much of the initial state of the individual, as on whether he is given one, two or three injections of any antigen.

It was hoped that just as three injections of an ordinary "F.T." could be regarded as standard and natural routine, so one injection of "A.P.T." could be adopted, pending the confirmatory Schick test some weeks later. But the tendency now is to regard two injections as being vastly preferable to one, and this is being admitted by some who have hitherto favoured the "one shot" method. Both in

the laboratory and in human beings it has been found that two well-spaced doses of even 0·1 cubic centimetre have given a better response than one of 1·0 cubic centimetre. This is what one would expect.

A Lasting Immunity.

As previously stated, the continuance of the Schick-negative state depends on a continuance of stimuli. If these are lacking, relapse to the Schick-susceptible state is to be expected sooner or later. Children in the crowded industrial areas of cities are bound to receive stimuli, but those who happen to escape contact with diphtheria bacilli and those living in country hamlets may revert within a year or two. In Melbourne with its high carrier rate relapse is not likely to be so common. Fitzgerald, of Toronto, found a relapse rate of 3% after one year, 8% after three years, and 34% after five years. Professor Picken a few months ago reported "a rather disappointing percentage of immunized children found to have relapsed to Schick-positive some years after immunization" in Chicago.

The relapse rate appears to be higher in children who have been immunized at an early age—preschool children and babies aged less than one year. It has been suggested that children who have been immunized when very young should be reexamined after the expiration of two or three years, and, if necessary, reimmunized.

But once a child has been Schick-immune, the potential immunity remains. This may diminish much more rapidly in some than in others; apparently in some it is not sufficient after a year or two to produce a quick enough response to the small amount of toxin in the Schick test dose. Potential immunity must consist in some altered quality or condition of body cells, but we do not know which cells, or why its lasting quality should vary. Estimation of the anti-toxin content of the blood will give us evidence of the occurrence of stimuli, but there is no way of measuring potential immunity. This we do know, however, that any child who has ever been Schick-immune has it in some degree, and that he is infinitely better off than one who has not.

Procedure in Immunization.

I have no intention of trying to lay down the law, but for the sake of brevity and clearness it is necessary to present any summary in somewhat dogmatic fashion and without qualifications in matters of detail.

It is customary to omit the preliminary Schick test in young children on the assumption that the great majority of them are susceptible. The arbitrary age limit may be six, seven or eight years. The age below which a given percentage of a child population is Schick-susceptible will, of course, vary greatly in different areas. Likewise the Moloney test is often omitted in young children, in view of the fact that they are much less liable to reactions than older children and adults. But again the age limit varies greatly, and many children under the age of seven years are Moloney reactors. It might therefore be worth while to perform both Schick and Moloney tests on all children who are to have the latter one. It is unfortunate that the reading of the Moloney test comes earlier than that of the Schick (forty-eight hours), but with high potency toxoids it has been found that in some cases a delayed Moloney reaction occurs as late as the seventh day. Some, therefore, use in young children a small injection of "F.T." or "A.P.T." as a "detector" dose (about 0·1 cubic centimetre). This gives an index of susceptibility and at the same time acts as a primary immunizing dose.

Should the patient be Moloney-negative, immunization can proceed in the ordinary way, and three injections of "F.T." of 1·0 cubic centimetre each at fortnightly intervals, or two of "A.P.T.", of 0·5 cubic centimetre each with an interval of a fortnight, can be given. An impression is gaining ground that the intervals might with advantage be lengthened to three weeks. If the "one shot" method is to be used, the customary dose is 1·0 cubic centimetre of "A.P.T." There can, I think, be no doubt as to the superiority of two smaller injections over one larger one.

Should, however, the patient, whether child or adult, react to the Moloney test, the "one shot" method should not be used. Such a person may be immunized by one of the methods recommended for such cases on an earlier page. Some advocate that if the Moloney reaction is pronounced artificial immunization should not be proceeded with, and I agree with this as far as adults and adolescents are concerned.

It is not permissible to omit the confirmatory Schick test at the end of the appropriate period. No one can say that he has immunized a child when all he has done has been to inoculate him with one, two or three doses of prophylactic. If the result of the test is still positive a further injection or injections should be made.

Now in the case of a child brought by its parents to the practitioner, I think the preliminary Schick test should be performed irrespective of age, if only for the information it gives as to the initial state of the child. If, then, immunization is to be gone on with, the way is quite clear. Any pronounced departure from the rules just laid down is wrong.

When we come to mass immunization of large communities of children, however, the way does not appear so clear. This work is usually the concern of a public health officer. I do not intend to argue on the matter of cheapness or cost; the subject cannot be debated. But the health officer is entitled to argue that with all this long procedure, extending over weeks and weeks, some parents may be "scared off", and many others will not bring their children to complete the course or appear for the confirmatory Schick test. But the records of intelligent campaigns carried out in many cities show that the proportion of people willing to have their children immunized is steadily increasing. What they are afraid of is the risk of reactions, and increasing care is being taken to avoid and lessen these. The second objection will not hold water. Even if 50% of the children do not appear for the third immunizing injection or the confirmatory test, nothing has been lost by giving them the opportunity to do so, and the fact that 50% have completed the course is all clear gain. I consider that there is no justification for withholding the opportunity from those who are willing to be immunized and not merely "inoculated".

Many interesting and fascinating subjects have not been touched on; for example, the influence of mass immunization on the carrier rate of a population; the mutation and degeneration of diphtheria bacilli in immune and non-immune carriers; and the value of the carrier in "naturally" immunizing a community. I have tried simply to state the position according to our present-day knowledge, and ask the reader to apply the statement to his own experiences and form his own conclusions.

In order to save space few references are made in the text, and no bibliography is appended. I shall be happy to supply references to any reader desiring them. Acknowledgements are due to scores of men and women in various countries, but particularly to the small British groups of workers, including O'Brien, Glenny, Topley, Parish, Dudley, Stallybrass and Underwood and their colleagues. To all concerned I offer acknowledgements and thanks.

F. V. SCHOLES.

British Medical Association News.

MEETING OF THE FEDERAL COUNCIL.

A MEETING of the Federal Council of the British Medical Association in Australia was held at the Medical Society Hall, Albert Street, East Melbourne, SIR HENRY NEWLAND, the President, in the chair.

Representatives.

The following representatives of the Branches were present:

New South Wales: Dr. George Bell, O.B.E., Dr. A. J. Collins, D.S.O., M.C.

Queensland: Dr. T. A. Price, Dr. N. W. Markwell (as substitute for Dr. D. Gifford Croll).
South Australia: Sir Henry Newland, C.B.E., D.S.O., Dr. E. Britten Jones.
Tasmania: Dr. S. Gibson, M.C., Dr. W. E. L. H. Crowther, D.S.O.
Victoria: Dr. J. Newman Morris, Dr. F. L. Davies.

Minutes.

The minutes of the previous meeting of the Federal Council on August 24, 1936, which had been circulated amongst members, were taken as read and signed as correct.

The Retirement of Dr. J. A. Dick and Dr. B. Smeaton.

Attention was drawn to the retirement from the Federal Council of Dr. J. Adam Dick and Dr. Bronte Smeaton. It was pointed out that Dr. Dick had been a member of the Federal Committee and of the Federal Council since 1921, and that during that time he had acted as Secretary and as Chairman; he had also been appointed as the first treasurer of the Federal Council. Dr. Smeaton had served as a member of the Federal Committee and subsequently of the Federal Council since 1924. It was resolved that a letter should be written to Dr. Dick and to Dr. Smeaton thanking them for their valuable services.

Appointment of Office-Bearers.

The Secretary announced that only one nomination had been received for the office of President, that of Sir Henry Newland. Sir Henry Newland was declared to be elected as President, and thanked the members for his election.

Only one nomination had been received for the position of Vice-President, that of Dr. J. Newman Morris. Dr. Morris was declared elected.

One nomination had been received for the position of Honorary Treasurer, that of Dr. George Bell; Dr. Bell was declared elected.

Finance.

The financial statement as at December 31, 1936, was presented. The statement included the Federal Council account and the Australasian Medical Congress (British Medical Association) Fund account. The statement was received.

Discussion on the levy of the *per capita* payment from the Branches to the Federal Council was deferred, so that it might be included in the discussion on the proposal for the formation of a full-time secretariat.

Medical Officers' Relief Fund (Federal).

An interim report for the half-year ended December 31, 1936, was received from the trustees of the Medical Officers' Relief Fund (Federal). Dr. George Bell explained that, with the exception of one practitioner to whom a loan had been made, all recipients were paying interest and some were paying off part of the principal. In this one instance extreme measures would be taken, because the recipient had consistently ignored all communications from the trustees.

In reply to a question from Dr. F. L. Davies, it was decided to request the trustees to consider whether the funds could be made available for helping in the education of the children of those eligible to receive benefits under the fund.

Resignation of Sir Thomas Dunhill from the Council of the Parent Body.

The Secretary announced that Sir Thomas Dunhill had tendered his resignation as member of the Council of the Parent Body representing the South Australian, Tasmanian, Victoria and Western Australian Branches. He had resigned on account of ill-health.

Sir Henry Newland said that all the Australian Branches were greatly indebted to Sir Thomas Dunhill; for many years he had represented the several Branches in turn on the Council of the Association. Sir Thomas Dunhill had always shown a lively interest and had been no mere figure-head; he had always appreciated communications from the Federal Council, particularly the minutes of the meetings.

The Council approved of Sir Henry Newland's suggestion that a letter of appreciation should be sent to Sir Thomas Dunhill.

Dr. J. Newman Morris said that one of the Branches had already made a nomination to the Parent Body of a successor to Sir Thomas Dunhill. This nomination had been made without reference to the other Branches concerned. He expressed the opinion that in such circumstances the Branches comprising the group that required a new representative should communicate with one another. He showed that the precipitate action of the Branch referred to might cause considerable embarrassment both to the Home Council and to the other Australian Branches concerned. He felt sure that if the position was explained to the Branches such an occasion would not arise in the future.

Advertisements of Proprietary Medicines.

A communication was received from the Federated Pharmaceutical Service Guild of Australia in regard to the control of advertisements of proprietary medicines. The guild pointed out that many proprietary medicines bore the words "recommended by your doctor", "recommended by your chemist", and so forth. While the members of the Federal Council were in sympathy with the views expressed in the letter, it was held that the matter was one for departmental control. On the motion of Dr. George Bell it was resolved that the Federated Pharmaceutical Services Guild of Australia should be communicated with suggesting that it should refer the matter to the National Health and Medical Research Council.

International Conference on Education.

The Secretary stated that in August-September, 1937, an International Conference on Education was to be held in Australia. A letter had been received by the President in which a request was made that the Federal Council might be included in the list of national organizations that had given support to the conference. It was resolved that the Council should comply with the request.

Refugee Medical Practitioners from Germany.

A letter was received from the Medical Board of Western Australia regarding the entry of refugee medical practitioners into Australia. Reference was made to the action taken by the Home Office in Great Britain, and it was resolved:

> That the Federal Council, having been informed through official channels that action to enable foreign graduates to practise in Australia is being taken, the Federal Council should draw the attention of the Commonwealth and State Governments to the situation and request that they take action similar to that being taken by the Home Office.

Repatriation Department Medical Officers' Association.

A letter was received through the Victorian Branch from the Repatriation Department Medical Officers' Association, forwarding a copy of the rules of the association and a list of its officers. The association also asked for information on the formation of special associations and their relationship with the British Medical Association. It was resolved that the information should be supplied.

Repatriation Department.

Further reference was made to the Entitlement Appeals Tribunal of the Department of Repatriation. At the last meeting of the Federal Council a letter had been received from a member of the Victorian Branch asking that the Federal Council would consider the procedure of the tribunal. The Secretary read a further letter from the Victorian member, and general discussion ensued. One member of the Council stated that entitlement to a pension could be determined only by a medical body. He

thought that the question of entitlement should be left to the medical officers of the Repatriation Department. The Entitlement Appeals Tribunal should not exist. It was his experience that the members of the tribunal often made up their minds whether a pension should be awarded and then sought medical opinions until they obtained one that suited their purpose. The matter was political and could not be altered. Another member said that the body was properly constituted and he thought that the members of the medical profession should try to work with it. The view was also expressed that in the circumstances it was surprising that more pensions had not been awarded. It was finally resolved that a subcommittee, consisting of Dr. A. J. Collins, Dr. George Bell and the Secretary, should inquire into the working of the Entitlement Appeals Tribunal and should report its findings to a later meeting of the Federal Council.

British Medical Association Scholarships and Grants.

The Secretary read a letter from the Medical Secretary of the Parent Body, London, regarding British Medical Association scholarships and grants for 1937. He also stated that two letters had been received from intending applicants in Australia. One applicant wished to undertake some new work, and the other sought renewal of his scholarship that he might complete work already undertaken.

Secretariat for the Federal Council.

At the previous meeting of the Federal Council consideration was given to the grant of £1,000 a year for three years that had been received from the Council of the British Medical Association in England. At that meeting a motion was moved by Sir Henry Newland to the effect that the grant be apportioned to the Australian Branches on the basis of four shillings and sixpence for each effective member. After discussion, in which representatives from the several Branches took part, the motion was lost. After further discussion the Federal Council appointed a subcommittee, consisting of Dr. J. Newman Morris and Dr. F. L. Davies, to inquire into the probable cost of appointing a full-time Federal medical secretary and also into the cost of a small executive of the Federal Council.

The subcommittee presented a report to this meeting. It was shown in the report that a sum of not less than £2,000 *per annum* would be necessary to meet the cost of a full-time secretariat with a full attendance at two council meetings a year. Moreover, with increased activities, increased expenditure would be incurred. In the opinion of the subcommittee, finance would at the present time present an insuperable difficulty. The subcommittee enumerated other possible arrangements that it had examined. The Queensland Branch had made the suggestion that an assistant Federal secretary should be appointed, and that Dr. Hunter should remain Secretary of the Federal Council, as at present. It was thought that the new appointee might be able to assist Dr. Hunter also in his work for the New South Wales Branch, so that Dr. Hunter would be free to undertake organization work of the profession throughout Australia. The subcommittee pointed out that if this suggestion was adopted, a decision as to its practicability would lie with the New South Wales Branch. Another suggestion made was that the positions of Editor of THE MEDICAL JOURNAL OF AUSTRALIA and of Secretary of the Federal Council might be combined. There was also the possibility of forming an Australian Medical Association, affiliated with the British Medical Association. In these circumstances the large sums of money that were now sent to England would be retained in Australia and would meet the cost of the Federal secretariat. The remaining possibility was that the Federal Council should be content with its present activities; this would involve (*a*) returning the grant to England or (*b*) retaining the grant and relieving the Branches of their present *per capita* payments for financing the Federal Council.

A general discussion on these possibilities took place. Sir Henry Newland said that the matter had not come before the Directors of the Australasian Medical Publishing Company, Limited, but from conversations that he had had with some of his brother directors he thought that it would be quite impracticable to combine the positions of Editor of THE MEDICAL JOURNAL OF AUSTRALIA and Secretary of the Federal Council. Dr. T. A. Price spoke in favour of the suggestion of the Queensland Branch, and he was supported in this view by Dr. W. E. L. H. Crowther. Dr. George Bell said that the suggestion had been considered by the New South Wales Branch Council and that the Branch Council was anxious to help in any way that it could. If a satisfactory arrangement could be made, the Council of the New South Wales Branch would be willing to set Dr. Hunter free that he might undertake organizing work for the Federal Council. Eventually it was resolved that the report of the subcommittee should be received and that the Federal Council should approach the New South Wales Branch to give effect to the suggestion that an assistant secretary should be appointed so that Dr. Hunter might be relieved of his Branch duties as required by the Federal Council. It was also resolved that the arrangements should be left in the hands of the New South Wales Branch and Dr. Hunter with the approval of the President.

It was decided that the question of the *per capita* payment from the Branches should be discussed at the next meeting of the Federal Council.

The Gold Medal of the Association.

At this stage of the meeting Sir Henry Newland was asked by Dr. J. Newman Morris to vacate the chair. Sir Henry Newland retired. Dr. J. Newman Morris took the chair and referred to the gold medal of the British Medical Association in Australia. He said that the medal had been awarded on only three occasions, the recipients being the late William Thornborough Hayward, the late Robert Henry Todd and the late William Henry Crago. Dr. Morris referred to the many years of devoted service that Sir Henry Newland had given to the Association in Australia. He moved that the gold medal of the Association be awarded to Sir Henry Newland and that the presentation should be made at the inaugural meeting of the fifth session of the Australasian Medical Congress (British Medical Association). The motion was carried unanimously.

On his return to the council room, Sir Henry Newland was informed of the decision of the meeting and expressed his pleasure and appreciation of the high honour which was to be conferred upon him.

Formation of Special Associations within the Association.

At the previous meeting of the Federal Council consideration was given to the formation of special associations within the profession. This had been the subject of discussion between representatives of the Home Association and the Federal Council at the time of the 103rd annual meeting of the Association in Melbourne in September, 1935. At the last meeting of the Federal Council a new article relating to the formation of special groups of members having distinctive professional interests was approved and a subcommittee, consisting of Dr. George Bell and Dr. J. Adam Dick, was appointed to draft by-laws in accordance with the new article.

The subcommittee presented its report. In the first place the subcommittee referred to counsel's opinion to the effect that, as the object of the Federal Council included the carrying out of the objects of the British Medical Association, or any of them, on behalf of the Branches in Australia, the formation of special groups of members for the purpose of exchange of scientific knowledge fell within the objects of the Federal Council. When the Federal Council's legal advisors were consulted, however, it had been found that, since that the Federal Council was a corporate body with definite limited membership, it was not possible for the Council to legislate by means of its articles in such a way as to control groups of persons who were not its own members. The subcommittee had therefore given consideration to the formulation of an article that would give the Federal Council power to

initiate or promote the formation of special groups. A copy of the new article was attached to the subcommittee's report.

It was also pointed out that, in order to enable a Branch to form its own special groups within the Association, consisting of its own members, and to concur with the Federal Council in the initiation and promotion by the Federal Council of special groups, it would be necessary for the Branch to take certain powers by the amendment of its rules—in the case of a corporate Branch, amendment of its articles. Such a rule or article had been drawn up by the subcommittee and had been attached to the report together with by-laws in accordance therewith.

The article and by-laws for the Federal Council were adopted, and it was resolved that a copy should be sent to the Branches together with the article and by-laws that were required by the Branches.

Australasian Medical Congress (British Medical Association).

Minutes of Executive Committee of the Fifth Session.

The minutes of the meetings of the executive committee of the fifth session of the Australasian Medical Congress (British Medical Association), to be held in Adelaide in August, 1937, were laid on the table.

Patrons and Vice-Presidents of the Fifth Session.

The Secretary stated that invitations had been sent to those appointed as patrons and vice-presidents of the fifth session of congress; he read the replies that had been received.

Expenses of Congress.

The Secretary reported that a further advance of £100 had been made towards the expenses of the fifth session.

Dr. E. Britten Jones moved on behalf of the South Australian Branch of the British Medical Association that the Federal Government should be approached and asked to make a donation towards the funds of the fifth session of congress. He explained that he took this step as a matter of principle. The Federal Government was in the habit of inviting the Branches of the British Medical Association in Australia to send delegates to Australian cancer conferences and then of informing them that they would have to pay their own expenses. Dr. George Bell seconded the motion.

Dr. F. L. Davies vigorously opposed the motion. He held that the medical profession should be able to finance its own congresses. After discussion the motion was lost.

Subscription to Congress.

On behalf of the executive committee of the fifth session the amount of subscription to be paid by husband and wife when both were members of the Association was raised. It was resolved that in such circumstances the subscriptions should be a subscription and a half.

Principles of Medical Ethics.

The Secretary reported that a common letter had been forwarded to the Branches, together with a copy of the report of the Federal Committee of 1914 dealing with the principles of medical ethics. A statement of the principles, together with the replies from the Branches, was presented to the meeting. On the motion of Dr. J. Newman Morris consideration of the matter was deferred.

Election of Members of the British Medical Association in Australia.

On behalf of the Queensland Branch, Dr. T. A. Price moved that all Branches should publish in THE MEDICAL JOURNAL OF AUSTRALIA the names of candidates one month before their election to membership. It was explained that a medical practitioner who was not acceptable to one Branch might, after being refused election by one Branch, move to another State and be elected to membership in that State. If he subsequently moved back to his original State, he would automatically become a member of the Branch that had originally refused him election.

Dr. F. L. Davies thought that if a Branch was in doubt about a candidate for election, it could always apply for information to the Branch of the State in which the candidate had previously resided. It was also suggested that the period of one month might be too short a time for such a Branch as the Western Australian Branch. Eventually it was decided that the words "at least" should be inserted into the motion so that it read:

> That all Branches publish in THE MEDICAL JOURNAL OF AUSTRALIA the names of candidates for election at least one month before their election.

It was agreed that this resolution could not possibly apply to new graduates in medicine.

Appointments of Hospital Medical Officers.

A letter was read from the Queensland Branch regarding the appointment of hospital medical officers. The communication was read and discussed, and it was resolved:

> That all members be directed to include in their application for any appointment the following conditions: "This application is subject to the conditions of appointment being approved by the Council of the British Medical Association."
>
> That where conditions are approved, hospital boards be requested to insert in their advertisements calling for applications the following words: "The conditions of this appointment are approved by the British Medical Association."

Federal Medical Registration.

At the last meeting of the Federal Council a motion on the subject of uniform medical registration was brought forward by Dr. J. Newman Morris. The Federal Council on that occasion decided that a subcommittee, consisting of Dr. J. Newman Morris, Dr. D. D. Paton and the President, should report on the best means by which this could be brought about. Dr. Morris reported that the subcommittee had been unable to meet, and therefore no report was available. He expressed the opinion that the Western Australian Act was the best of all the State Acts. He read a letter on the subject from Dr. D. D. Paton, in which the same opinion was put forward. He thought it was very unlikely that the States would hand over to the Federal authority their sovereign rights in the matter of medical registration; the best that could be hoped for in the present state of affairs was the adoption of a uniform Act. Consideration was deferred.

Civil Aviation Landing Grounds.

At a former meeting of the Federal Council the subject of civil aviation landing grounds was discussed. It was pointed out that the matter was of importance from the point of view of medical practitioners who were called upon to attend patients in the country, and from that of patients who had to be transferred from one centre to another by aeroplane. The Secretary reported that letters had been written to the municipal associations in the several States and to the Branches. The replies were read and it seemed that something would be done. The correspondence was received.

Precautions Against Gas Attacks in Warfare.

At the previous meeting of the Federal Council it was decided that the attention of the Branches should be drawn to the need for instructing the public in precautions to be taken in gas attacks in warfare. The Secretary outlined the steps that had been taken in the several States.

Recruitment of Medical Practitioners in War-Time.

Consideration was given to the obligations of the members of the medical profession to its members when they were on military duty. In this connexion reference was made to a minute of the Federal Committee on February 2, 1918.

The Conditions of Service of Medical Officers in the Royal Australian Navy.

Further reference was made to the conditions of service of medical officers in the Royal Australian Navy. It was noted that the following provisions existed in regard to the counting of civil hospital time prior to entry into the service:

(i) The seniority of a surgeon-lieutenant who prior to entry held an appointment as resident medical or surgical officer in an approved civil hospital may be antedated in respect of time spent in such an appointment to such an extent not exceeding one year as may be recommended by the Naval Board.

(ii) The time served prior to entry in an approved civil hospital which has been allowed to count towards seniority shall be allowed as time served towards the period of three years necessary to qualify for increment of pay as surgeon-lieutenant.

Catgut.

At the last meeting of the Federal Council the question of the manufacture of catgut in Australia was referred to the Federal Health Council. A reply had been received that the matter was under consideration.

Reciprocity Between State Hospitals in Different States.

The question of reciprocity between hospitals in different States was considered at the last meeting of the Federal Council, at the instance of the South Australian Branch. The Branch based its communication on an instance in which it was held that hardship had been inflicted on a patient in South Australia. The matter was referred at that time to the Director-General of Health of the Commonwealth, with the request that he would bring it before the Federal Health Council. A reply was received from the Director-General in which he stated that the Federal Health Council considered that such cases were not of frequent occurrence and were not matters of routine administration, and that, generally speaking, such cases were to be met by the recognized, if unwritten, obligation to house indigent patients even if they might come from another State.

It was resolved that a copy of the Director-General's letter should be sent to the South Australian Branch.

National Health and Medical Research Council.

The Secretary reported that since the last meeting of the Federal Council a communication had been received from the Director-General of Health, Commonwealth Department of Health, asking the Federal Council to nominate a representative as a member of the National Health and Medical Research Council. The President had nominated Dr. J. Newman Morris, and Dr. Morris had accepted the nomination. The action of the President was endorsed.

A Federal Policy for General Medical Services.

At the last meeting of the Federal Council, at the instance of Dr. T. A. Price, principles for a general medical service were adopted. The Secretary reported that these principles had been sent to the Prime Minister and the premiers of the several States. The replies were received.

Time and Place of the Next Meeting.

The determination of the time and place of the next meeting was left in the hands of the President, who said that the meeting would probably be held at Adelaide during the week before the commencement of the fifth session of the Australasian Medical Congress (British Medical Association).

Vote of Thanks.

A vote of thanks was accorded to the Council of the Victorian Branch of the British Medical Association for having provided accommodation for the meeting and for its hospitality.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Austin, Hartley Willson, M.B., B.S., 1935 (Univ. Sydney), Sydney Hospital, Sydney.

Blackburn, Charles Ruthven Bickerton, M.B., B.S., 1937 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Gatenbury, Harold Bowers, M.B., B.S., 1936 (Univ. Sydney), St. George District Hospital, Kogarah.

Bradley, Henry Houghton Burton, M.B., B.S., 1937 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Deck, Maurice Feild, M.B., B.S., 1935 (Univ. Sydney), 9, Kardinia Road, Clifton Gardens.

Hatcher, Frank, M.B., B.S., 1935 (Univ. Sydney), Wyadra Avenue, North Manly.

Joseph, Maurice Roy, M.B., B.S., 1936 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Kellett, William Hessel, M.B., B.S., 1935 (Univ. Sydney), 39, East Esplanade, Manly.

Morey, Max Robert, M.B., B.S., 1933 (Univ. Sydney), 337, Anzac Parade, South Kensington.

Moore, Geoffrey Henry, M.B., B.S., 1936 (Univ. Sydney), Prince Henry Hospital, Little Bay.

Murphy, Patrick Francis, M.B., 1935 (Univ. Sydney), 13, Gloucester, Campbell Parade, Bondi.

Skype, Joseph Michael, M.B., B.S., 1935 (Univ. Sydney), Newcastle Hospital, Newcastle.

Rowntree, Sutcliffe Cameron, M.B., B.S., 1937 (Univ. Sydney), Royal North Shore Hospital of Sydney, St. Leonards.

Obituary.

GRAFTON ELLIOT SMITH.

PROFESSOR J. L. SHELLSHEAR has been good enough, at our request, to write the following appreciation of the work of the late Sir Grafton Elliot Smith.

The late Sir Grafton Smith's contributions to science are so well known that it is unnecessary to attempt their survey. It is more interesting and instructive to analyse the great influence which his work and personality have impressed upon scientific thought, and also to consider those factors, both innate and environmental, which have made such achievement possible.

It is, of course, difficult to separate clearly these factors, but I feel that my close friendship with him and a close association with his scientific work make it incumbent on me to essay the task. That he was richly endowed with great mental gifts was apparent to all with whom he came in contact; and that these gifts were part of his heritage is apparent from the honoured place which his family holds in New South Wales—honoured particularly in places of education and learning. The description of the Talgai skull by his brother, S. A. Smith, bears the same stamp of clear thought and expression which characterizes all Elliot Smith's writings. Without such inherited background, environmental influences are of little avail; but, in the case of Elliot Smith, I believe that the type of his early education and his association with eminent men soon after graduation played a very large rôle in the development of his personality and scientific outlook, which have had a profound effect upon the scientific world.

All who are associated with education in medicine feel an inadequacy. Elliot Smith himself realized this and was a careful student of the methods of medical education. His views on the teaching of anatomy, published in the *Edinburgh Medical Journal* in 1918, show a keen regard for the student's educational welfare. It behoves us, therefore, to study the life of Elliot Smith to find what light it can throw on this difficult and disputed question.

Whilst I was engaged in putting together these ideas, the volume of *The Journal of Anatomy* dedicated to Sir Grafton Elliot Smith came to hand. In it Professor J. T. Wilson gives a biographical sketch of his early career and therefore relieves me of the necessity of dealing with it as I had intended. We can see from his account that Elliot Smith's school training was thorough. It was guided by his father, and that the first principles of education must have been regarded as of more importance than the subject matter taught is apparent from the fact that another son became Director of Education for New South Wales. Wilson tells us: "In the following year (1888), at the age of seventeen, young Elliot Smith entered the University of Sydney as a student of medicine. The first year of the curriculum in medicine was at that time devoted almost entirely to purely 'Arts' subjects, literary and mathematical: This comparative breadth of study in the curriculum in medicine had a good deal to recommend it, and its later abandonment under pressure of the increasing demands of more specialized scientific and medical subjects was a regrettable necessity."

Provided the student is firmly grounded in the first principles of medicine and surgery, it is questionable whether the demand of the specialized subjects is a necessity at all; and I am firmly convinced that this early and generalized training in "Arts" was a factor in bringing to fruition those qualities which made Elliot Smith rightly famous. The further examination of his early training is necessary if we are to understand the tremendous influence which he was to exercise later on so many branches of the anthropological and biological sciences. Having completed his medical course and house appointments, he returned to the anatomical department in the University of Sydney in 1894, at the age of twenty-three. Within the year he wrote his first paper on the "Cerebral Commissures of the Mammalia". "This paper", Wilson writes, "already contained the germ of the brilliant conception which was later to go far to revolutionize so much of our knowledge of brain morphology, more especially of the rhinencephalon. Some years later, indeed, Edinger, the celebrated Frankfurt neuro-morphologist, referred to this early paper as a classic." There are two interesting points in this early paper which show how his mind was working. In the first place he introduces his first serious publication with a quotation from Huxley, and, secondly, having put forward his evidence with true Huxleian pungency, he says: "The important question, 'What is the significance of the *corpus callosum?*' must now be considered."

That he was influenced by Huxley throughout his life was well known, and the atmosphere in which he learnt to know the writings of Huxley must have had a great influence in the formation of his scientific character. Haswell was professor of biology, with J. P. Hill as lecturer, Wilson his professor of anatomy, David professor of geology, and at the same time C. J. Martin was working in the department of physiology under Anderson Stuart. With the exception of Haswell, who had already made a name for himself, all these men were under thirty. Tradition tells us not only of the enthusiastic researches of this youthful band in a country where enthusiasm is unashamed, but also of their hearty mutual cooperation. What must have been the quality of their discussions on the problems of evolution we know from their subsequent writings, and what their enthusiasm for research into the structure of the Monotremes and Marsupials we know from the stories of their camping expeditions in search of material.

The very nature of their work in so generalized a field precluded the possibility of too early specialization, and the abundance of their material demanded careful selection of facts relevant to their problems. Elliot Smith shows the imprint of this early influence in all his writings. Whilst Haswell worked on the classification of the animals under the strong influence of Darwin's teachings, made pungent by the writings of Huxley, Wilson brought to bear on the problems the anatomical training he had acquired in Edinburgh under Turner. Wilson's broad generalized knowledge permitted him to take his full share with J. P. Hill in investigating what the reproductive organs had to reveal—an investigation brought to brilliant fruition by the later writings of J. P. Hill—and at the same time to realize that the brain holds a key position in biological problems. It was Wilson's shrewd insight which guided Elliot Smith to investigate the morphology of the nervous system. It detracts nothing from Elliot Smith's greatness to pay a higher tribute to Wilson than he pays himself when he says: "I think that I may assume some credit for guidance of his first steps along the pathways of the literature of anatomical investigation, though not for the choice of the precise problems to which he presently turned his attention."

These two always maintained the closest touch with one another, and many of us have to acknowledge with gratitude those influences which have affected our scientific careers. Theirs was a dual influence so harmoniously blended that analysis is impossible.

There are those who would have confined Elliot Smith to the subject of neurology; but his whole early training and teaching were opposed to rigid specialization. His knowledge of first principles had already saved him from the inevitable penalty of early specialization, and he might have been describing his own educational rise to manhood when he wrote in 1912: "But the race is not always to the swift, and the lowly group of mammals which took advantage of its insignificance to develop its powers evenly and very gradually without sacrificing in narrow specialization any of its possibilities of future achievement, eventually gave birth to the dominant and most intelligent of all living creatures." His knowledge of the diverse subject of anthropology was profound. He has been acknowledged as the English leader of neuro-anatomy, and those who have had the privilege of hearing him speak must admit that his knowledge of the anatomy of the body was by no means secondary to that of the brain. The catalogue of the brains in the Royal College of Surgeons reveals a work which extends beyond the limits of neurology into the depths of the difficult subject of biological classification. His knowledge of prehistory and the interest which he inspired, particularly from the study of the endocranial casts of primitive man, find expression in many contributions to science and, indirectly, in the discovery of Peking Man by the late Davidson Black, an inspired student of his chief. Finally, no matter what side is taken, the cultural aspects of anthropology have been adorned by his labours.

His generalized outlook in every subject which he touched was perhaps the most outstanding feature of his intellectual life. The question put in his first published work, "What is the significance?" remains the question throughout his whole life. He disregards facts merely as facts. He collects them for their apparent significance. "The aim of these preliminary studies is to enable us to discriminate between important and valueless features, between the kind of information that is worth collecting and that which it would be a mere waste of time to seek. It is a necessary preliminary to all useful work to learn the relative value of the data upon which our conclusions are to be based; otherwise the investigation is likely to produce as a result nothing better than a heterogeneous collection of facts, which are meaningless." ("Studies in Morphology of the Human Brain", Cairo, 1904.) And that he was a connoisseur in the collection of significant facts he abundantly proves in the same paper as though in answer to the challenging words of the introduction. He makes the sulci of the brain tell their story. No longer is the problem to fit the pattern of the sulci to a preconceived diagram. The sulci are parts of a great mechanism; they have a functional significance, some limiting areas of known histological structure, some infolded within an area, and so on.

His influence on neurological science is well expressed by Ariëns Kappers, the Director of the Institute for Brain Research in Amsterdam: "When I returned to Amsterdam [thirty years ago] and came into close contact with the English leader of neuro-anatomy I was, because of this earlier experience, impressed by his all-round knowledge and broad view of neurological problems, problems of comparative morphology and fissuration of the brain rather neglected since Campbell's, Brodmann's,

Mott's and Vogt's valuable work on cyto- and myelotectonics.

"Prof. Elliot Smith's work . . . could not fail to impress all those interested in more general aspects of brain anatomy; the more so as several of his most striking results were obtained in fields of neuro-anatomy that had been open to anatomists for more than one hundred years."

The influence of which Kappers speaks was very widespread. My journeyings in France, in company with Dr. Abbie, were a revelation to us of the esteem in which our distinguished master was held. It was not alone in the paths of neurology that we trod. We visited the laboratory of Anthony, the department of archæology and ethnology under Rivet, the museums at St. Germain, Toulouse and other places. We met the Abbé Breuil, Le Comte Bègouen, Anthony, Rivet and many others. For his learning, whether in the morphology of the brain, biology, archæology, ethnology or other subjects, these great men had a very profound admiration; but what impressed us more was the depth of that affection which we shared with them. On looking back, it now seems inevitable that France should have awarded him, in May, 1936, with one of the highest honours that she can pay, the *Croix de Chevalier de la Légion d'Honneur*.

In America the valuable and intensive work of Meyer, Osborn, Herrick, Johnston and many others was greatly enhanced by Elliot Smith's interpretations of the homologies of the forebrain, which supplied a long-sought answer to many of their problems. It was his critical selection of the significant homologies which was the valuable complement to their work. In those days Elliot Smith's writings and criticisms were as pungent as they were to be later; and yet we, who have been privileged to work with him, are under no misapprehension as to the value of the labours of Herrick, Johnston and others, nor of the work of those who have been trained in their schools. In the same way one could show with equal confidence how his work has had its influence on the works of Edinger, Cajal and Genna, names chosen apart from their fame to represent the German, Spanish and Italian schools of learning.

In the certain confidence that the evaluation of his influence on neurological science is clearly demonstrable one must not overlook the fact that posterity will judge us sparing in our appreciation of his contribution, because they will see more clearly those works, which are really his and which we now accept as part of the general fund of knowledge. Scientific advancement is peculiarly responsive to cooperative effort. His close relationship with Head and Rivers must have been beneficial to neurology; but it was not in neurology that his close association with Rivers was to produce its astounding reaction. The story of Elliot Smith's work in Egypt is well known: how he became involved in the anthropological remains on the construction of the Assouan Dam. It is a mistake to suggest that he thereby discontinued his interest in neurology. He merely applied that knowledge which should be found in every anatomist. His descriptions of the anthropological material bore the same marks of his genius as did his contributions to the anatomy of the brain. But his interests carried him even beyond the limits of anatomy, into the wide fields of cultural anthropology. He supplied the solution to the difficulties which confronted Rivers in the interpretation of the vast amount of material which he had collected in his explorations. The theory of the now-famous "diffusion of culture" was born and with it an era of controversy. The problem at issue was whether the cultural phenomena distributed widely throughout the world had arisen independently, or whether there had been a general diffusion of cultural ideas from a central source, which was probably Egypt.

On account of the fact that I have discovered that few students of anthropology in Sydney (the home of Elliot Smith) have read his works, and that his works are practically unobtainable in Sydney on account of there being no demand for them, it is desirable to quote from him at some length; for, whereas his influence on neurological thought may have been dimmed by its acceptance into the body of common knowledge, his influence on the subject of anthropology is deeply impressed on the scientific world today.

"For instance, it is quite conceivable (though I believe utterly opposed to the evidence at our disposal) that different people might, independently the one of the other, have invented the practices of mummification, building megalithic monuments, circumcision, tattooing, and tarraced irrigation; evolved the stories of the petrification of human beings, the strange adventures of the dead in the underworld, and the divine origin of kings; and adopted sun-worship.

"But why should the people of America and Egypt who built monuments build them in accordance with very definite plans compounded of Egyptian, Indian and East Asiatic models? And why should the same people who did so also have their wives' chins tattooed, their sons circumcised, their dead mummified? Or why should it be the same people who worshipped the sun and adopted the curiously artificial winged-sun-and-serpent symbolism, who practised terraced irrigation in precisely the same way, who made idols and held similar beliefs regarding them, who had identical stories of the wanderings of the dead in the underworld?"

In all his writings there is a spirit of controversy. I mention this feature of controversy because it is one of the most interesting questions in the study of his work and personality, and one of which I have some knowledge. As I have previously indicated, wherever I have travelled there is one feature which stands out more prominently than any other in my mind, and that is that any of the great men of science, who came into contact with him, had more than a mere impersonal admiration for his work. They may, or may not, have come under the whip of his controversial pen; they had a profound affection for him.

His controversial writing was a character acquired from Huxley. He had no personal feeling in his writings, but a constant regard for the maintenance of exact truth. The Huxley Memorial Lecture for 1928 delivered by him bears the striking title "Conversion in Science". It helps to throw considerable light on his scientific attitude. He writes: "In spite of the completeness of the evidence which goes to establish these fundamental facts, which lie at the heart of all anthropological inquiry, there is the same sort of opposition to admitting the obvious and patent evidence as there was in the sixteenth century to recognize Galileo's simple experiment, or in the nineteenth century to admit the conclusive force of Darwin's demonstration of the reality of evolution." "It is an error", Turgot wrote, "which opposes the progress of truth; it is indolence, obstinacy, the spirit of routine, everything that favours inaction." In his search for truth he never failed to give full acknowledgement to the work of others. He fully recognized that progress in knowledge is not the work of one individual. His writings abound in references.

Naturally Elliot Smith's name will be established more by the written than the spoken word; but today his scientific character is best known to those who have known him by the spoken word. Great as was his influence when he addressed a gathering, it was still greater in the informal meetings outside congresses. In his public utterance he was quiet, impressive and non-controversial. He spoke as one having authority. Dr. P. V. van Stein Callenfels, one of the world's leading anthropologists, met Elliot Smith for the first time at the fourth Pacific Science Congress held in Java in 1929. At that congress were many leading anthropologists, including Kleiweg de Zwann, Goloubew, Davidson Black, Callenfels, Radcliffe-Brown and others. The rich field of archæological material was open for discussion. Dr. Callenfels, some time after, told me how the presence of Elliot Smith led him to expect some tense argument on questions of diffusion of culture, and for this he prepared himself. But when it came to the point he was overwhelmed, not only by the master's intimate knowledge of the subjects under discussion, but also by that side of his character, until then unsuspected by Callenfels, which endeared him to all. Those of us who were present at that congress felt very strongly the bonds of affection which tied us to Elliot Smith.

To hold preeminence in subjects as diverse as neurology and cultural anthropology is in itself sufficient justifica-

tion for regarding Elliot Smith as one of the world's greatest scientists; but the weight of his authority was felt almost as strongly, if not entirely so, in general anatomy, physical anthropology, human history, prehistory and palæontology. We shall never know how great was his influence in the discoveries of fossil man in China and how much we owe Davidson Black's masterly and brilliant descriptions to the early training received from Elliot Smith.

And yet there remain other tributes to pay. He would have graced any chair of English and literature. In all his writings and in his speeches there was always a perfect command of English. The right words, exactly expressing shades of meaning, and the right construction came with ease and grace. In his writings on cultural anthropology he fully appreciated the significance of phallic worship, fertility and sex symbolism, but his descriptions are given with a taste worthy of the highest traditions of the medical profession to which he belonged, and left no appeal to vulgar sex curiosity.

Is it any wonder that he was a great and inspiring teacher? His influence extended beyond the realms of investigation and in teaching he practised exactly what he preached when he wrote: "In this country [England] there is far too much spoon-feeding. The student should be required to find things by his own unaided efforts—to be allowed to get into difficulties and find his way out. This teaches him observation and impresses the essential facts of anatomy on his mind in a way which does not occur when he constantly has a demonstrator at his elbow to save him any mental exertion."

The scientific world is his debtor in research, the medical profession in teaching and the British Empire in teachers.

The University of Sydney, through Wilson and Elliot Smith, has directly and indirectly provided teachers of anatomy throughout the British Empire and in America. In his great influence in training and stimulating those in search of truth Elliot Smith is the protagonist of youth. In his own youth he found inspiration in men—Wilson, Hill, Martin—still in their twenties, or in men, such as Haswell, who had proved themselves in their youth. Furthermore, during his years in Cambridge the memory of Balfour must have been an inspiration. And surely he has repaid the debt in his influence on Hunter, Davidson Black, Perry and so many others.

Congress Notes.

AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION): FIFTH SESSION.

The Sections and their Office-Bearers.

THE following is a list of the sections that will meet at the fifth session of the Australasian Medical Congress (British Medical Association) at Adelaide in August next, together with the sectional office-bearers:

Section of Anæsthetics.

President: Dr. M. Kasner Moss, Hay Street, West Perth, Western Australia.

Vice-Presidents: Dr. H. Hunter, 17, Oxford Street, Waverley, New South Wales; Dr. F. W. Green, 14, Collins Street, Melbourne, C.1, Victoria; Dr. G. V. Anson, 716, High Street, Lower Hutt, Wellington, New Zealand; Dr. Allan D. Lamphee, Smith Street, Walkerville, South Australia.

Local Honorary Secretary: Dr. D. R. Wallman, 18, Grange Road, New Hindmarsh, South Australia.

Section of Ophthalmology.

President: Dr. M. C. Gardner, 12, Collins Street, Melbourne, C.1.

Vice-Presidents: Dr. C. Morlet, 252, St. George's Terrace, Perth; Dr. J. B. Hamilton, 174, Macquarie Street, Hobart; Dr. Cedric K. Cohen, 229, Macquarie Street, Sydney; Dr. W. A. Fairclough, Imperial Buildings, Queen Street, Auckland, C.1; Dr. Brian Moore, 206, North Terrace, Adelaide.

Local Honorary Secretary: Dr. G. H. B. Black, 206, North Terrace, Adelaide.

Section of Oto-Rhino-Laryngology.

President: Dr. G. R. Halloran, 143, Macquarie Street, Sydney.

Vice-Presidents: Dr. C. E. Wassell, Ballow Chambers, Wickham Terrace, Brisbane; Dr. B. Hiller, 174, Macquarie Street, Hobart; Dr. Jas. Hardie Neil, 64, Symonds Street, Auckland, C.1; Dr. Raymond V. Hennessy, 55, Collins Street, Melbourne, C.1; Dr. Adrian Farmer, 260, St. George's Terrace, Perth; Dr. W. Sangster, 175, North Terrace, Adelaide.

Local Honorary Secretary: Dr. R. M. Glynn, 175, North Terrace, Adelaide.

Section of Medicine.

President: Dr. Konrad Hiller, 12, Collins Street, Melbourne, C.1.

Vice-Presidents: Dr. Alex. Murphy, Ballow Chambers, Wickham Terrace, Brisbane; Dr. R. Whishaw, 174, Macquarie Street, Hobart; Dr. J. G. Hislop, 260, St. George's Terrace, Perth; Professor D. W. Carmalt Jones, The Medical School, Dunedin, New Zealand; Dr. A. S. Walker, 185, Macquarie Street, Sydney; Dr. D. R. W. Cowan, 168, North Terrace, Adelaide.

Local Honorary Secretary: Dr. K. Stuart Hetzel, 178, North Terrace, Adelaide.

Section of Obstetrics and Gynæcology.

President: Professor R. Marshall Allan, University of Melbourne, Carlton, N.3, Victoria.

Vice-Presidents: Dr. F. B. Craig, 143, Macquarie Street, Sydney; Dr. E. B. Moore, 154, Macquarie Street, Hobart; Dr. G. A. Thompson, Mount Street, Perth; Dr. Kenneth MacKenzie, 27, Princes Street, Auckland; Dr. H. S. Waters, National Mutual Chambers, Queen Street, Brisbane; Dr. R. E. Magarey, 178, North Terrace, Adelaide.

Local Honorary Secretary: Dr. H. M. Fisher, 188, North Terrace, Adelaide.

Section of Dermatology.

President: Dr. K. G. Colquhoun, Albany Road, Toorak, S.E.2, Victoria.

Vice-Presidents: Dr. John H. Kelly, 61, Collins Street, Melbourne, C.1; Dr. J. E. McGlashan, 205, St. George's Terrace, Perth; Dr. J. J. Witton Flynn, 175, Macquarie Street, Sydney; Dr. F. H. Makin, 198, North Terrace, Adelaide.

Local Honorary Secretary: Dr. W. C. T. Upton, 178, North Terrace, Adelaide.

Section of Pædiatrics.

President: Dr. H. Douglas Stephens, 41, Spring Street, Melbourne, C.1.

Vice-Presidents: Dr. E. H. M. Stephen, 135, Macquarie Street, Sydney; Dr. P. A. Earnshaw, Ballow Chambers, Wickham Terrace, Brisbane; Dr. A. W. Shugg, 174, Macquarie Street, Hobart; Dr. L. G. Male, 260, St. George's Terrace, Perth; Dr. Helen Mayo, 197, North Terrace, Adelaide.

Local Honorary Secretary: Dr. D. G. McKay, Lister House, North Terrace, Adelaide.

Section of Pathology, Bacteriology and Experimental Medicine.

President: Professor W. K. Inglis, New Medical School, University of Sydney, Sydney.

Vice-Presidents: Professor H. A. Woodruff, 48, Fellows Street, Kew, E.4, Victoria; Dr. G. C. Taylor, Ballow Chambers, Wickham Terrace, Brisbane; Dr. S. N. Michaels, 260, St. George's Terrace, Perth; Dr. R. E. Richards, Commonwealth Department of Health, Launceston, Tasmania; Professor J. B. Cleland, University of Adelaide, North Terrace, Adelaide.

Local Honorary Secretary: Dr. A. E. Platt, Adelaide Hospital, North Terrace, Adelaide.

Section of Public Health, Preventive Medicine and Tropical Hygiene.

President: Sir Raphael Cilento, Ipswich Road, Annerley, Brisbane.

Vice-Presidents: Dr. J. Bell Ferguson, Public Health Department, 364, Little Lonsdale Street, Melbourne, C.1; Dr. R. C. E. Atkinson, Department of Public Health, Perth; Professor Harvey Sutton, Commonwealth Health Department, University of Sydney; Dr. F. S. Hone, 178, North Terrace, Adelaide; Dr. M. H. Watt, Director-General of Health, Wellington, C.1, New Zealand.

Local Honorary Secretary: Dr. A. R. Southwood, 168, North Terrace, Adelaide.

Section of Surgery.

President: Professor G. Grey Turner, Huntercombe Manor, Taplow, Bucks, England.

Vice-Presidents: Dr. F. L. Gill, 250, St. George's Terrace, Perth; Dr. G. Bell, 133, Macquarie Street, Sydney; Dr. W. W. Giblin, 142, Macquarie Street, Hobart; Dr. L. M. McKillop, Orient Line Building, Eagle Street, Brisbane; Dr. B. T. Zwar, 107, Collins Street, Melbourne, C.1; Dr. A. M. Cudmore, 188, North Terrace, Adelaide.

Local Honorary Secretary: Dr. P. S. Messent, 192, North Terrace, Adelaide.

Section of Neurology and Psychiatry.

President: Dr. J. K. Adey, Receiving House, Royal Park, N.2, Victoria.

Vice-Presidents: Dr. H. M. North, 131, Macquarie Street, Sydney; Dr. S. V. Sewell, 12, Collins Street, Melbourne, C.1; Dr. John Bostock, Wickham Terrace, Brisbane; Dr. H. K. Fry, 196, North Terrace, Adelaide.

Local Honorary Secretaries: Dr. L. C. E. Lindon, 188, North Terrace, Adelaide; Dr. H. M. Birch, Mental Hospital, Parkside.

Section of Radiology and Electrical Therapy.

President: Dr. J. G. Edwards, 185, Macquarie Street, Sydney.

Vice-Presidents: Dr. A. S. Johnson, 250, St. George's Terrace, Perth; Dr. R. D. McIntosh, 180, Macquarie Street, Hobart; Dr. P. Clennell Fenwick, 22, Gloucester Street, Christchurch; Dr. John O'Sullivan, 49, Spring Street, Melbourne, C.1; Dr. Val. McDowall, 131, Wickham Terrace, Brisbane; Dr. H. C. Nott, 111, Hutt Street, Adelaide.

Local Honorary Secretary: Dr. H. A. McCoy, 163, North Terrace, Adelaide.

Section of Orthopædic Surgery.

President: Dr. R. B. Wade, 143, Macquarie Street, Sydney.

Vice-Presidents: Dr. C. Gordon Shaw, 55, Collins Street, Melbourne, C.1; Dr. A. Marion Radcliffe Taylor, 205, St. George's Terrace, Perth; Dr. G. A. C. Douglas, Inchcolm, Wickham Terrace, Brisbane; Dr. H. Gilbert, 188, North Terrace, Adelaide.

Local Honorary Secretary: Dr. N. Stannus Gunning, 196, North Terrace, Adelaide.

Section of Naval, Military and Air Force Medicine and Surgery.

President: Dr. F. T. Bowerbank, Kelvin Chambers, Wellington.

Vice-Presidents: Dr. R. Fowler, 85, Spring Street, Melbourne, C.1; Dr. S. G. Gibson, 177, Macquarie Street, Hobart; Colonel J. C. Storey, 185, Macquarie Street, Sydney; Dr. S. R. Burston, 188, North Terrace, Adelaide; Dr. Ernest Culpin, Ballow Chambers, Wickham Terrace, Brisbane.

Local Honorary Secretary: Dr. F. H. Beare, 206, North Terrace, Adelaide.

Section of Medical Literature and History.

President: Dr. L. Cowlishaw, Gordon Road, Lindfield, New South Wales.

Vice-Presidents: Dr. C. F. Macdonald, 455, High Street, East Malvern, S.E.6; Dr. C. P. Bryan, Newspaper House, St. George's Terrace, Perth; Dr. W. E. L. H. Crowther, 190, Macquarie Street, Hobart; Sir James Elliott, 43, Kent Terrace, Wellington, New Zealand; Dr. C. E. C. Wilson, 78, Fisher Street, Fullarton, South Australia; Dr. Neville G. Sutton, 217, Wickham Terrace, Brisbane.

Local Honorary Secretary: Professor J. B. Cleland, University of Adelaide, North Terrace, Adelaide.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A MEETING of the Senate of the University of Sydney was held on February 8, 1937.

Dr. Arthur E. Mills was elected to the office of Deputy Chancellor.

The following degrees were conferred:

Bachelor of Medicine (*M.B.*) *and Bachelor of Surgery* (*B.S.*): John Murray Alexander, David Charles Fison, Robert Chalmers Gill, James Alexander Inglis, Harold Geoffrey Marsh, Ralph Douglas Kenneth Reye, Lionel Pelham Sapsford, Doris Adeline Selby, M.Sc., Stuart Montserrat Stephenson, James Frederick Noel Thomas, Weeks White.

Bachelor of Medicine (*M.B.*): Harold Dundonald Macky Hercus, B.Sc., William Patrick Ryan.

The following appointments were approved: Dr. A. D. Gillies as Lecturer in Pathology; Dr. L. W. Dunlop as Lecturer in Clinical Medicine at Sydney Hospital.

Proceedings of the Australian Medical Boards.

VICTORIA.

A MEETING of the Medical Board of Victoria was held on January 7, 1937. The proceedings were as follows:

Registrations: Wilhelmina Johanna Wagenmaker, M.B., Ch.B. (Edinburgh), 1935; Rupert Francis Leslie Victor Harvey, L.R.C.P., L.R.C.S. (Edinburgh), L.R.F.P.S. (Glasgow), 1930.

Deaths Reported.—No. 1307, Godfrey Ernest Garde; No. 1687, Arthur Machen Hill (senior); No. 1494, Robert Wellesley Lethbridge.

With reference to the request made by the Medical Council of India, that certain Indian medical qualifications be recognized in Victoria, a statement was received from the General Medical Council showing the extent to which Indian diplomas were registrable in the United Kingdom. As it was intimated that it was expected that the question of resuming the recognition of diplomas granted by the Universities of Calcutta and Punjab would be discussed by the Executive Committee of the Council in February next, consideration of the matter was deferred pending the receipt of the decision reached by the committee.

Correspondence was received relative to alleged careless professional treatment by practitioners, and the writers were informed that the nature of the complaints indicated that the proper course was to consult their legal advisers.

Advice was received from the Crown Solicitor that the question of the conduct of a medical practitioner is one which must be determined according to professional standards, and that the Board was the authority to decide whether there was a *prima facie* case for the erasure or removal of a practitioner's name from the register.

After consideration of a report regarding the activities of Horace W. Thomson, William H. Simmonds and William A. Hill in country districts, it was decided to recommend to the Chief Secretary that steps be taken to warn the public that none of these persons is registered as a legally qualified medical practitioner in Victoria.

An inquiry was received from the Medical Secretary, British Medical Association, London, as to whether there were any restrictions on the registration of German doctors who have obtained the diploma of the Scottish Conjoint Board after one year of clinical study in the United Kingdom, and it was decided to reply that the Board would refuse to register any person by virtue of a diploma obtained after less than five years' regular medical and surgical study in the country of origin.

The secretary was instructed to point out, in addition, that, under the provisions of the Medical Acts, the Board is unable to recognize a German qualification for the purposes of registration.

Diary for the Month.

FEB. 23.—New South Wales Branch, B.M.A.: Medical Politics Committee.
FEB. 24.—Victorian Branch, B.M.A.: Council.
FEB. 25.—South Australian Branch, B.M.A.: Branch.
MAR. 2.—New South Wales Branch, B.M.A.: Organization and Science Committee.
MAR. 2.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
MAR. 3.—Victorian Branch, B.M.A.: Branch.
MAR. 3.—Western Australian Branch, B.M.A.: Council.
MAR. 4.—South Australian Branch, B.M.A.: Council.
MAR. 5.—Queensland Branch, B.M.A.: Branch.
MAR. 9.—New South Wales Branch, B.M.A.: Ethics Committee.
MAR. 9.—New South Wales Branch, B.M.A.: Medical Politics Committee.
MAR. 12.—Queensland Branch, B.M.A.: Council.
MAR. 16.—New South Wales Branch, B.M.A.: Council (Quarterly).
MAR. 17.—Western Australian Branch, B.M.A.: Branch.
MAR. 18.—New South Wales Branch, B.M.A.: Annual Meeting.
MAR. 23.—New South Wales Branch, B.M.A.: Council.
MAR. 24.—Victorian Branch, B.M.A.: Council.
MAR. 25.—South Australian Branch, B.M.A.: Branch.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xxii to xxiv.

COMMONWEALTH OF AUSTRALIA, DEPARTMENT OF HEALTH: Medical Officer.
MUNICIPALITY OF NEW NORFOLK, TASMANIA: Medical Practitioner.
ROYAL HOSPITAL FOR WOMEN, PADDINGTON, NEW SOUTH WALES: Honorary Anæsthetist.
ROYAL NORTH SHORE HOSPITAL OF SYDNEY, NEW SOUTH WALES: Temporary Honorary Clinical Assistant.
SAINT VINCENT'S HOSPITAL, MELBOURNE, VICTORIA: Honorary Officers.
TABOOM HOSPITAL, TABOOM, QUEENSLAND: Medical Officer.
THE BRISBANE AND SOUTH COAST HOSPITALS BOARD, QUEENSLAND: Honorary Officers.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY Hospital are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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